FINAL REPORT
VOLUME II
TECHNICAL APPENDICES
ANCHORAGE COASTAL STUDY
INTEGRATED TERRAIN UNIT MAPPING, AUTOMATION AND ANALYSIS

ESRI
380 New York Street
Redlands, California 92373

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TECHNICAL APPENDICES
ANCHORAGE COASTAL STUDY
INTEGRATED TERRAIN UNIT MAPPING, AUTOMATION AND ANALYSIS

Prepared for:

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December, 1981

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INTEGRATED TERRAIN UNIT MAP

DATA VARIABLES AND CODES

INTERPRETED VARIABLES

LANDFORMS

Landform Combinations (Column 1)

1 = X

2 = X + Y

3 = $\frac{X}{Y}$

4 = $X + \frac{Y}{Z}$

5 = $\frac{X}{Y} + Z$

6 = $\frac{X}{Y + Z}$

7 = $\frac{X + Y}{Z}$

Landform Connectors/Modifiers (Columns 5, 9 and 13)

0 = No connector/modifier

1 = ? (Previous landform element questionable)

2 = +

3 = ?/+

4 = or

5 = ?or

Landform Types (Columns 2-4, 6-8 and 10-12)

000 = ?	Unknown Origin
010 = Bx	Bedrock-Undifferentiated
011*= Bx-r	Bedrock-residual soil
012*= Bx-w	Bedrock-weathered or poorly consolidated
013*= Bx-u	Bedrock-unweathered
015*= Bxf	Frozen Bedrock
016*= Bxf-r	Frozen Bedrock-residual soil
017*= Bxf-w	Frozen Bedrock-weathered or poorly consolidated
018*= Bxf-u	Frozen Bedrock-unweathered
019 = Bxt	
030 = I	Igneous Bedrock(Refer to modifiers under Bx)
040 = Ib	Basalt
050 = Ibv	Shield or Composite Volcano
060 = Ig	Granite (Includes other intrusives)
070 = Ip	Pyroclastics (Includes extrusive fragmentals, ash and tu
080 = Ipv	Cinder Cone
100 = N	Metamorphic Bedrock (Refer to modifiers under Bx)
110 = Ng	Gneiss
120 = Nl	Slate, Phyllite
130 = Nm	Marble
140 = Np	Serpentinite
150 = Nq	Quartzite
160 = Nx	Schist
200 = S	Sedimentary Bedrock (Refer to modifiers under Bx)
210 = Sc	Conglomerate
220 = Sh	Shale
230 = Sl	Limestone
240 = Ss	Sandstone
300 = C	Colluvial Deposits
310 = Ca	Avalanche Deposits
315 = Cg	Rock Glacier
320 = Cl	Landslide
325 = Cm	Mudflow Deposits
330 = Cs	Solifluction Deposits
331 = Csf	Solifluction Colluvial Fan
335 = Ct	Talus
336 = Ctc	Talus Cone
337 = Ctp	Protalus Rampart
340 = Cx	Basin Colluvium-Arctic Slope
360 = E	Eolian Deposits
370 = El	Loess
371 = Ell	"Lowland" Loess
372 = Elu	"Upland"Loess (predominantly unfrozen)
373 = Elx	Frozen Upland Silt
380 = Es	Eolian Sand
400 = F	Fluvial Deposits
410 = Fd	Delta
420 = Ff	Alluvial Fan (Primary depositional agent is running wate for solifluction fans, see Colluvial Landforms)

421 = Ffg	Gravelly Alluvial Fan
422 = Ffs	Finer-Grained Alluvial Fan (Primarily silt and sand)
430 = Fm	Mud Volcano
440 = Fp	Floodplain
441 = Fp-c	Floodplain Cover Deposits
442 = Fp-p	Floodplain Point Bar Deposits
443 = Fp-r	Floodplain Riverbed Deposits
445 = Fpb	Braided Floodplain
446 = Fpb-c	Braided Floodplain Cover Deposits
447 = Fpb-p	Braided Floodplain Point Bar Deposits
448 = Fpb-r	Braided Floodplain Riverbed Deposits
450 = Fpm	Meander Floodplain
451 = Fpm-c	Meander Floodplain Cover Deposits
452 = Fpm-p	Meander Floodplain Point Bar Deposits
453 = Fpm-r	Meander Floodplain Riverbed Deposits
455 = Fps	Sandy Floodplain
456 = Fps-c	Sandy Floodplain Cover Deposits
457 = Fps-p	Sandy Floodplain Point Bar Deposits
458 = Fps-r	Sandy Floodplain Riverbed Deposits
460 = Fpa	Abandoned Floodplain
461 = Fpa-c	Abandoned Floodplain Cover Deposits
465 = Fpc	"Creek" or Small Watercourse Floodplain
470 = Fpo	"Bog" Floodplain
475 = Fpt	Old Terrace
500 = Fs	Retransported Deposits
510 = Fsh	"Hilly" Retransported Deposits
515 = Fsl	"Lowland" Retransported Deposits
520 = Fsr	"Rounded" Retransported Deposits
525 = Fsw	"Wooded" Retransported Deposits
535 = Fsa	Sandy Retransported Deposits (From dune sand areas)
540 = Ft	Terrace
590 = FG	Undifferentiated Glacial and Non-Glacial Granular Deposits
600 = G	Glacial Deposits
605 = Gl	"Lowland" Glacial Deposits
610 = Gg	Glacier
611 = Cgm	Ice-cored Glacial Moraine
620 = Gm	Moraine
621 = Gmo	Older Moraine
622 = Gmy	Younger Moraine
650 = Gt	Till Sheet
651 = Gtd	Drumlins
652 = Gtf	Fluted Till
653 = Gtl	"Lowland" Till
654 = Gto	Older Till
655 = Gty	Younger Till
700 = GF	Glaciofluvial Deposits
705 = Gfl	"Lowland" Glacialfluvial Deposits
710 = GFo	Outwash
720 = GFk	Kame Deposits
730 = GFe	Esker Deposits

750 = GL	Glaciolacustrine Deposits
755 = GL1	"Lowland" Glaciolacustrine Deposits
800 = L	Lacustrine Deposits
810 = Le	Emergent Lake Bottom
815 = Lt	Thaw Basins and Thaw Lakes
820 = Lp	Playas
850 = M	Marine Deposits
860 = Mc	Coastal and Coastal Plain Deposits
861 = Mb	Beach Deposits
862 = Mt	Tidal Flat
863 = Mte	Recently Emerged Tidal Flats
870 = Mf	Fine-grained Marine Deposits
875 = Me	Coarse-grained Marine Deposits
880 = MG	Glaciomarine Deposits
881 = MG1	"Lowland" Glaciomarine Deposits
890 = O	Organic Deposits
895 = Os	String Bog
900 =	Miscellaneous
910 = P	Plinthite (Laterite) Crusts
980 = H	Man-Made Deposits
981 = Hc	Cut or Excavation (Not used in mapping)
982 = Hf	Fill and Embankments
983 = Ht	Mine Tailings
990 = W	Water or Ice
991 = W1	Lake/Pond
992 = Ws	Stream/River
993 = Wi	Permanent Snow and Ice
994 = Wo	Ocean

VEGETATION

Vegetation Type*/Combinations (Columns 14, 15, 16 and 17)

Code	Primary Vegetation	with Other Vegetation Types
2100 =	21	None
2101 =	21	22
2102 =	21	41, 60
2103 =	21	22, 60
2104 =	21	22, 41
2105 =	21	41, 61
2106 =	21	25, 61
2107 =	21	22, 60
2108 =	21	60
2109 =	21	41
2110 =	21	60, 63
2111 =	21	41, 69
2112 =	21	62
2113 =	21	60, 62
2200 =	22	None
2201 =	22	24, 25

*Note: These modifiers may be applied to any of the bedrock landforms

Code	Primary Vegetation	with Other Vegetation Types
2202 =	22	21, 60
2203 =	22	60
2204 =	22	25, 60
2205 =	22	24
2206 =	22	25, 69
2207 =	22	21
2208 =	22	41, 60
2209 =	22	25
2210 =	22	41
2211 =	22	24, 41
2212 =	22	25, 62
2213 =	22	25, 61
2214 =	22	21, 24
2215 =	22	60, 63
2216 =	22	21, 61
2217 = (2210)		
2218 =	22	21, 41
2219 =	22	61
2220 =	22	24
2221 =	22	60, 69
2222 =	22	61, 69
2400 =	24	None
2401 =	24	41, 60
2402 =	24	25, 60
2403 =	24	22, 60
2404 =	24	22, 25
2405 =	24	25, 60
2406 =	24	25, 41
2407 =	24	25
2408 =	24	22
2409 =	24	60
2410 =	24	21, 60
2411 =	24	21, 25
2412 =	24	21, 22
2413 =	24	60, 69
2414 =	24	25, 69
2415 =	24	41
2416 =	24	21
2417 =	24	41, 69
2418 =	24	60, 61
2419 =	24	25, 63
2500 =	25	None
2501 =	25	24
2502 =	25	41, 61
2503 =	25	41, 60
2504 =	25	22, 60
2505 =	25	60, 62

Code	Primary Vegetation	with Other Vegetation Types
2506 =	25	41
2507 =	25	24, 60
2508 =	25	21, 41
2509 =	25	21, 60
2510 =	25	42, 60
2511 =	25	60
2512 =	25	21
2513 =	25	21, 60
2514 =	25	42, 62
2515 =	25	21, 62
2516 =	25	61
2517 =	25	60, 61
2518 =	25	60, 63
2519 =	25	42
2520 =	25	22
2521 =	25	22, 61
2522 =	25	22, 41
2523 =	25	22, 81
2524 =	25	24, 41
2525 =	25	41, 69
2526 =	25	61, 69
2527 =	25	60, 69
2528 =	25	62, 64
2529 =	25	22, 24
2530 =	25	22, 69
2700 =	27	None
2701 =	27	61
2800 =	28	None
2801 =	28	25, 61
2802 =	28	60, 61
4100 =	41	None
4101 = (4114)		
4102 =	41	25, 61
4103 =	41	21, 61
4104 =	41	60
4105 =	41	21, 60
4106 =	41	22, 60
4107 =	41	25, 69
4108 =	41	69
4109 =	41	63, 69
4110 =	41	22, 69
4111 =	41	25
4112 =	41	22
4113 =	41	21, 69
4114 =	41	25, 60
4115 =	41	22, 25
4116 =	41	21
4117 =	41	61
4118 =	41	61, 69

Code	Primary Vegetation	with Other Vegetation Types
4120 =	41	24, 69
4121 =	41	21, 62
4122 =	41	60, 69
4123 = (4107)		
4124 =	41	60, 61
4125 =	41	60, 62
4126 =	41	62
4127 =	41	24, 60
4200 =	42	None
4201 =	42	25
4202 =	42	21
5000 =	50	None
5001 =	50	52
5002 =	50	51
5100 =	51	None
5101 =	51	50
5102 =	51	52
5200 =	52	None
5201 =	52	50
6000 =	60	None
6001 =	60	63
6002 =	60	27, 61
6003 =	60	41, 61
6004 =	60	62
6005 =	60	21, 22
6006 =	60	22
6007 =	60	22, 25
6008 =	60	25, 62
6009 =	60	22, 62
6010 =	60	62, 65
[illegible] =		
6012 =	60	21, 62
6013 =	60	25
6014 =	60	25, 41
6015 =	60	21, 63
6016 =	60	61
6017 =	60	63
6018 = (6014)		
6019 =	60	22, 63
6020 =	60	24, 63
6021 =	60	62, 63
6022 =	60	24, 25
6023 =	60	69
6024 =	60	21
6025 =	60	25, 69

Code	Primary Vegetation	with Other Vegetation Types
6026 =	60	63, 69
6027 =	60	41
6028 =	60	24
6029 =	60	41, 69
6030 =	60	22, 69
6031 =	60	25, 63
6032 =	60	21, 24
6033 =	60	24, 69
6034 =	60	21, 41
6035 =	60	21, 69
6100 =	61	None
6101 =	61	25, 27
6012 =	61	41, 60
6103 =	61	60
6104 =	61	27
6105 =	61	27, 69
6106 =	61	41, 69
6107 =	61	25
6108 =	61	21, 60
6109 =	61	22, 63
6110 =	61	25, 60
6111 =	61	50, 60
6112 =	61	60, 63
6113 =	61	27, 63
6114 =	61	25, 69
6115 =	61	60, 69
6200 =	62	None
6201 =	62	25
6202 =	62	21, 65
6203 =	62	65, 66
6204 =	62	22
6205 =	62	25, 60
6206 =	62	22, 65
6207 =	62	60
6208 =	62	64, 65
6209 =	62	60, 65
6300 =	63	None
6301 =	63	60
6302 =	63	60, 69
6303 =	63	69
6304 =	63	61
6305 =	63	22
6306 =	63	22, 60
6307 =	63	60, 81
6308 =	63	25

Code	Primary Vegetation	with Other Vegetation Types
6500 =	65	None
6501 =	65	66, 67
6502 =	65	66
6503 =	65	21, 66
6504 =	65	25, 62
6700 =	67	None
6701 =	67	65
6702 =	67	65, 66
6900 =	69	None
6901 =	69	41
6902 =	69	61
6903 =	69	60
6904 =	69	22, 41
6907 =	69	63
6908 =	69	25
6909 =	69	25, 60
6910 =	69	25, 41
6911 =	69	60, 63
6912 =	69	41, 60
6913 =	69	41, 61
6914 =	69	21, 41
6915 =	69	68
6916 =	69	41, 68
7000 =	70	None
8000 =	80	None
9100 =	91	None
9200 =	92	None
9600 =	96	None
9700 =	97	None
9800 =	98	None

*Individual Vegetation Type Codes

FOREST AND WOODLAND

Closed Forest

21 = Coniferous Forest, White Spruce, Short Stands
22 = Deciduous Forest, Mixed Forest, Young Stands

24 = Deciduous Forest, Mixed Forest, Medium-Aged Stands
25 = Coniferous Forest, White Spruce, Tall Stands
26 = Deciduous Forest, Mixed Forest, Old Stands
27 = Cottonwood, Young Stands
28 = Cottonwood, Medium-Aged Stands
29 = Cottonwood, Old Stands

Open Forest-Woodland

31 = Coniferous Forest, White Spruce, Short Stands
32 = Deciduous Forest, Mixed Forest, Medium-Aged Stands
33 = Coniferous Forest, White Spruce, Tall Stands
34 = Deciduous Forest, Mixed Forest, Old Stands
35 = Cottonwood, Medium-Aged Stands
36 = Cottonwood, Old Stands

Closed Forest (Black Spruce Mountain Hemlock)

41 = Black Spruce, Short Stands
42 = Black Spruce, Tall Stands
45 = Mountain Hemlock, Short Stands
46 = Mountain Hemlock, Tall Stands

Open Forest-Woodland (Black Spruce)

43 = Black Spruce, Short Stands

NON-FORESTED

Salt Water Wetlands

50 = Salt Grassland
51 = Low Shrub
52 = Tidal Marsh

Tall Shrubs

60 = Alder
61 = Alder-Willow (streamside veg.)

Low Shrub

62 = Willow Resin Birch

Grassland

63 = Upland Grass

Tundra

64 = Sedge-Grass
65 = Herbacious
66 = Shrub
67 = Mat and Cushion

Freshwater Wetlands

68 = Sphagnum Bog
69 = Sphagnum-Shrub Bog

Cultural Features

70 = Cultural Influences

Barren

80 = Mud Flats
81 = Rock

Permanent Snow and Ice

82 = Snowfield
83 = Glacier

Water

91 = Lakes greater than 40 ac. (census water)
92 = Lakes at least 10 ac., but less than 40 ac.
96 = Streams and Rivers at least 165 feet wide, but less than 600 feet wide
97 = Rivers greater than 1/8 mile (census water)
98 = Ocean

SURFICIAL GEOLOGY

Surficial Geology Type (Columns 18 and 19)

Coarse-Grained Surficial Deposits

11 = (an) Alluvial plain deposits
12 = (al) Alluvium in channels, terraces and floodplains
13 = (af) Alluvial fans and cones and emerged deltas
14 = (ga) Glacial alluvium in kames, eskers and related landforms
15 = (sh) Sand deposits in hills
16 = (sl) Sand deposits by lakes

Fine-Grained Surficial Deposits

21 = (///) Peat
22 = (l) Lake and pond sediments (may include undifferentiated bog deposits)
23 = (s) Silt and estuarine deposits
24 = (bc) Bootlegger Cove Clay

Mixed Coarse and Fine-Grained Surficial Deposits

31 = (m) Morainal deposits
32 = (gm) Glacial and/or marine deposits in hills
33 = (mg) Marine, glacial, and/or lacustrine deposits in broad, low areas
34 = (c) Colluvium (slope deposits)
35 = (ls) Landslide deposits
36 = (f) Man-made fill (when obscures original units)

Bedrock

41 = (b) Bedrock, primarily metamorphosed sedimentary rocks

Waterbody

99 = Waterbody

SLOPE

Average Slope Gradient (Column 20)

1 = 0 - 3%
2 = 3 - 7%
3 = 7 - 12%
4 = 12 - 20%
5 = 20 - 30%
6 = 30 - 45%
7 = > 45%
9 = Waterbody

SURFACE FORM

Surface Form Type (Column 21)

1 = Simple
2 = Undulating
3 = Complex
9 = Waterbody

SOILS

Soil Type (Columns 22 and 23)

01 = (An) Anchorage fine sandy loam
02 = (Ca) Caswell silt loam
03 = (Ch) Chena silt loam
04 = (Cm) Clam Gulch silt loam
05 = (Cn) Cryaquents, loamy

06 = (Cog) Cryorthents, gravelly, fill
07 = (Com) Cryorthents, loamy, fill
08 = (Crg) Cryorthents, gravelly, smoothed
09 = (Crm) Cryorthents, loamy, smoothed
10 = (Csd) Cryorthents - Doroshin complex
11 = (Css) Cryorthents - Salamatof complex
12 = (Do) Doroshin peat
13 = (Gd) Goodhope silt loam
14 = (G.P.)Gravel pits
15 = (Gr) Grewingk sandy loam
16 = (Ho) Homestead silt loam
17 = (Hs) Homestead silt loam, very shallow
18 = (Ja) Jacobsen very stony silt loam
19 = (Ka) Kalifonsky silt loam
20 = (Ks) Kasilof silt loam
21 = (Mr) Moose River silt loam
22 = (Ns) Niklason silt loam
23 = (Pu) Purches silt loam
24 = (Rn) Raven very stony silt loam
25 = (Rw) Riverwash
26 = (Sa) Salamatof peat
27 = (Sm) Slikok mucky silt loam
28 = (Sp) Spenard silt loam
29 = (St) Starichkof peat
30 = (To) Torpedo Lake gravelly, sandy loam
31 = (Tu) Tuomi silt loam
32 = (Ub) Urban land
33 = (Ro) Rock outcrop
34 = (Hs-Ro) Homestead silt loam, very shallow - Rock outcrop
35 = (Tn) Turnagain extremely cobbly silt loam
36 = (Tn-Ro) Turnagain extremely cobbly silt loam - Rock outcrop
50 = Urban land disturbed (no soil survey)
51 = Fire Island (no soil survey)
99 = (W) Waterbody

Soil Survey (Column 24)

1 = Anchorage area soil survey
2 = No soil survey

PRE-INTERPRETED GEO-ENVIRONMENTAL VARIABLES

SLOPE STABILITY

Slope Stability Rating (Column 25)

1 = Generally high to highest stability
2 = Moderate stability
3 = Generally low stability
4 = Lowest stability
9 = Waterbody

MASS WASTING

Mass Wasting Rating (Columns 26 and 27)

00 = No known potential
10 = Low to moderate potential
20 = Moderate to high potential
30 = Highest known potential
  31 = Known snow avalanche path(s)
  32 = Known rockfall/rockslide area
  33 = Known landslide area
99 = Waterbody

SEISMICALLY INDUCED GROUND FAILURE

Ground Failure Rating (Column 28)

1 = Lowest ground failure susceptibility
2 = Moderately low failure susceptibility
3 = Moderate failure susceptibility
4 = High failure susceptibility
5 = Very high failure susceptibility
9 = Waterbody

FLOODPLAIN/COASTAL FLOODING/EROSION

Flooding Rating (Column 29)

0 = No flooding
1 = Documented 100-year floodplain
2 = Interpreted 100-year floodplain
3 = Documented coastal flooding
4 = Interpreted coastal flooding
7 = Documented flooding waterbody
8 = Interpreted flooding waterbody
9 = Waterbody

Erosion Rating (Column 30)

0 = No erosion
1 = Slow to negligible coastal erosion
2 = Slow to moderate coastal erosion
3 = Rapid coastal erosion
9 = Waterbody

FOUNDATION CONDITIONS

Foundation Conditions Rating (Column 31)

1 = Foundation conditions excellent
2 = Foundation conditions good
3 = Foundation conditions generally good to fair but locally poor
4 = Foundation conditions generally fair to poor
5 = Foundation conditions poor
9 = Waterbody

GROUNDWATER

Groundwater Rating (Column 32)

1 = > 20 ft. to groundwater (low potential for drainage problems)
2 = < 20 ft. to groundwater (moderate potential for drainage problems)
9 = Waterbody

PERMAFROST

Permafrost Rating (Column 33)

1 = Moderate potential for permafrost conditions
2 = High potential for isolated conditions
3 = Unassessed potential
9 = Waterbody

WETLANDS

Wetlands Type (Column 34)

0 = No Wetland
1 = Patterned open complex
2 = Non-patterned elongated complex
3 = Lakeside bog
4 = Old river terrace complex
5 = Concentric colsed complex
6 = Forested closed basin bog/swamp
7 = Non-forested bog or wet meadow
8 = Large freshwater marsh/coastal wetland
9 = Waterbody

Wetland Name (Columns 35, 36, and 37)

001 = Little Campbell Lake
002 = Sand-Sundi-Jewell Lakes
003 = De Long Lake
004 = Meadow Lake
005 = Post Office-Spenard David Quest - S. Earthquake
006 = Connors Lake-Strawberry Lake
007 = South of Campbell Lake
008 = South of Campbell Lake
009 = Klatt Road
010 = South Klatt Road
011 = John's Road
012 = Campbell Creek
013 = Tudor Road and C Street
014 = Chester Creek and 15th Avenue
015 = Chester Creek and South 15th Avenue
016 = Lake Otis
017 = Waldron Lake-Tudor
018 = Seward Highway-Dowling
019 = South Fort-Campbell Creek
020 = New Seaward Highway-Dowling
021 = Little Campbell Creek Abbott and O'Malley
022 = O'Malley and Seaward Highway
023 = Huffman and Otis Parkway
024 = Huffman Road and Otis Parkway
025 = Huffman Road
026 = Furrow Creek
027 = Rabbit Creek
028 = South of Rabbit Creek Road
029 = Rabbit Creek Road
030 = Rabbit Creek Road
031 = Huffman Road
032 = O'Malley and Buck Road
033 = O'Malley and Buck Road
034 = Lake Hideway
035 = (Mary's Pond) Hillside Drive and Abbott Road (Kettle Hole)
036 = Hillside Drive and Abbott Road
037 = Service-Henshaw School
038 = Campbell Airstrip-South Fork Campbell Creek
039 = Campbell Airstrip - South Fork Campbell Creek
040 = North Fork - Campbell
140 = North Fork - Campbell (40a)
041 = North Fork - Campbell
042 = North Fork
043 = Next to 40
044 = Baxter Bog Park-South Branch Chester
045 = Tudor Road
046 = South Russian Jack Spring Park

047 = 36th Avenue and Providence Hospital
048 = Goose Lake - University
049 = Middle Fork - South Fork Campbell Creek
050 = Muldoon Road and Northern Lights
051 = South Fork Chester Creek
151 = Fort Richardson (51a)
152 = Fort Richardson (51b)
052 = Foothill Slope
053 = Foothill Slope
054 = South of Glenn Highway and Ship Creek
055 = South of Glenn Highway
056 = Glenn Highway and Turpin
057 = Russian Jack Springs Park
058 = Davis and Ranger Ship Creek
059 = Near Ship Creek
060 = Little Rabbit Creek
061 = Little Rabbit Creek
062 = South Fork Campbell Creek
063 = Glenn Highway and Eagle River
064 = Glenn Highway and Eagle River
065 = Glenn Highway and Eagle River
066 = Glenn Highway and Eagle River
067 = South of Eagle River and West of Glenn Highway
068 = South of Eagle River and West of Glenn Highway
069 = South of Eagle River and West of Glenn Highway
070 = South Eagle River and West of Glenn Highway
170 = West Glenn Highway and Eagle Creek
071 = South of Eagle River and West of Glenn Highway
072 = South of Eagle River and West of Glenn Highway
073 = South of Eagle River and West of Glenn Highway
074 = South of Eagle River and West of Glenn Highway
075 = North Eagle Road, West Glenn Highway
076 = Fire Creek
077 = Lake Clunie
078 = Lake Clunie
079 = Lake Clunie
080 = Lake Clunie - North End
081 = West of Lake Clunie
082 = West of Lake Clunie
083 = North of Lake Clunie
084 = (Hilard Road) South of Eagle River
085 = Along Eagle River
086 = Eagle River
087 = Eagle River
088 = North Side Eagle River
089 = Eagle River
090 = Lower Eagle River Trail, Mid-Eagle River Side
091 = Mide-Eagle River (91a)
191 = Eagle River
092 = Middle Eagle River
093 = North Side of Eagle River

094 = South Side Eagle River
095 = Southwest of Beach Lake
096 = Beach Lake
097 = South of Psalm Lake
098 = South of Psalm Lake
099 = East of Lake Clunie
100 = West of Lower Fire Lake
101 = West of Lower Fire Lake
102 = West of Lower Fire Lake
103 = Upper Fire Lake
104 = Upper Fire Lake
105 = Lower Fire Lake
106 = North of Upper Fire Lake
206 = North of Upper Fire Lake (106a)
107 = Glenn Hwy Near Birchwood Road
108 = Parks Creek
109 = Parks Creek
110 = Mink Creek
111 = Birchwood Road
112 = Fire Creek
113 = Mirror Lake
114 = West of Mirror Lake
115 = West of Mirror Lake
215 = Mirror Lake (115a)
116 = South of Edmonds Lake
117 = Northwest of Edmonds Lake
118 = West of Edmonds Lake
119 = Northwest of Edmonds Lake
120 = North of Edmonds Lake
121 = North of Edmonds Lake
122 = North of Edmonds Lake
123 = West of Edmonds Lake
124 = West of Mirror Lake
125 = West of Mirror Lake
126 = West of Mirror Lake
127 = South of Eklutna River
128 = Parks Creek
129 = Chugiak
130 = Fire Creek
131 = Eklutna Flats

500 = Coastal Wetland

600 = Ship Creek Wetland

700 = Fish Creek Wetland

800 = Fire Island Coastal Wetland

999 = Waterbody

HABITATS

Habitat Types (Column 38)

0 = No habitat
1 = Shore birds, gulls, terns, waterfowl migration, staging and nesting areas.
2 = Moose wintering area.
3 = Anadromous fish.
4 = Shore birds, gulls, terns, waterfowl migration, staging and nesting areas. Moose wintering area.
5 = Moose wintering area. Anadromous fish.
6 = Shore birds, gulls, terns, waterfowl migration, staging and nesting areas. Moose wintering area. Anadromous fish.

LAND USE/SEISMIC/ELEVATION MAP

DATA VARIABLES AND CODES

INTERPRETED VARIABLES

ELEVATION PROVINCE

Elevation Zone (Column 1)

1 = 0 - 40m
2 = 40 - 100m
3 = 100 - 300m
4 = >300 m

LAND USE

Land Use Type (Columns 2 and 3)

01 = Single-family house
02 = Duplex
03 = Apartment/Condominium
04 = Mix Residential
05 = Mobile Home
06 = Commercial
07 = Institutional
08 = Industrial
09 = Extractive
10 = Transportation (General)
11 = Transportation (Institutional)
12 = Park
13 = Agriculture
14 = Non-developed
15 = Vacant disturbed
16 = Transportation (Communication)

PRE-INTERPRETED VARIABLES

EARTHQUAKE INTENSITY

Intensity Rating (Column 4)

0 = Area of unknown surface rupture potential relative to the suspected knik fault
1 = Area subject to generally lower intensities/shorter period (shallow bedrock)
2 = Area subject to higher intensities/longer period (deep alluvium)
9 = Water, unassessed potential

12 = Parks

This class includes local and regional parks and golf courses.

13 = Agriculture

This class includes all crops and pasture lands.

14 = Non-Developed

This class includes all vacant undisturbed "natural" areas.

15 = Vacant Disturbed

This class includes all unbuilt areas where excavation or clearing was evident but no structures had been built.

16 = Transportation (Communication)

Radio and Television broadcast facilities including antenna fields.

PRE-INTERPRETED GEO-ENVIRONMENTAL VARIABLES

-EARTHQUAKE INTENSITY ZONES

0 = Zone of Unknown Surface Rupture Potential Relative To The Suspected Knik Fault Zone

1 = Area Subject to Generally Lower Intensities and Shorter Period Shaking

Estimated maximum expectable earthquake intensity at VI to VII (modified Mercalli intensity). This zone is generally underlain by bedrock at shallow depths and will experience shorter period shaking with less potential for damage to tall structures.

2 = Area Subject to Generally Higher Intensities and Longer Period Shaking

Estimated maximum expectable earthquake intensity at VIII to XI. This zone is generally underlain by thick sediments, and will experience longer period shaking. Buildings with long fundamental periods would have a greater potential for damage in this area compared with Zone 1.

Appendix B
Data Code Descriptions

Integrated Terrain Unit Manuscript
- Interpreted Environmental Data
  - Landforms
  - Vegetation
  - Surficial Geology
  - Slope Gradient
  - Surface Form
  - Soil
- Pre-Interpreted Geo-Environmental Data
  - Slope Stability
  - Mass Wasting
  - Seismically Induced Ground Failure
  - Floodplain/Coastal, Flooding/Erosion
  - Foundation Conditions
  - Groundwater
  - Permafrost
  - Wetlands
  - Habitats
- Land Use/Seismic/Elevation
  - Interpreted Environmental Data
    - Elevation Province
    - Land Use
  - Pre-Interpreted Geo-Environmental Data
    - Earthquake Intensity

LAND USE/SEISMIC/ELEVATION MAP
DATA CODE DESCRIPTIONS

INTERPRETED VARIABLES

-ELEVATION PROVINCES

1 = 0 - 40 meters

2 = 40 - 100 meters

3 = 100 - 300 meters

4 = > 300 meters

-LAND USE

1 = Single Family

These are "typical" urban and suburban residential dwellings with a single home occupying each lot. They become a key component to defining urban because they are served by all utilities, are on paved or graded streets, and are provided with or have access to all urban facilities such as schools, parks, police, and fire stations.

2 = Duplex

The key to this class is that the structures house more than one family. They may be duplexes or triplexes. They are urban in nature and are served with all urban functions. This class includes larger single family homes which have been subdivided into multi-family facilities.

3 = Apartments and Condominiums

This class may be either large single structures or groups of structures with ample parking. This class will be used for most garden apartments, but may not include small courts as listed above in 2. It will not include single family homes which have been subdivided into apartments or rooming houses. It will include multi-story structures.

4 = Mixed Residential

Mixtures of classes 1, 2, 3 and other dissimilar classes such as corner commercial where no pattern occupies a majority of the 10 acre minimum area.

5 = Mobile Homes and Trailer Parks

This includes all mobile home parks. This class applies to vacant as well as occupied trailer spaces in mobile home parks. It does not describe isolated mobile homes which fall within 1, or transient facilities such as motor home camps which fall into 6.

6 = Commercial

This class includes the majority of the commercial services. Among these are financial, personal, business, professional services, and non-professional services (e.g. janitorial, preschool, delivery, etc.). High-rise buildings which house multiple uses will be classified here, unless they are a part of the Central Business District.

7 = Institutional

This class includes all civil offices, jails, post offices, city halls, county administrative facilities, courts, libraries sheriff, fire stations, ambulances, and emergency command facilities such as Civil Air Patrol, Search and Rescue, and Emergency Communications Centers (only when locations are not classified). Health care facilities, Elementary schools, Junior High schools, High schools, colleges and universities and churches. Also any military facilities which are not classified except airfields and shipping ports.

8 = Industrial

This class provides a very wide range of structures and facilities. It includes all manufacturing activities. It also includes wholesaling and warehousing, research and development, wrecking yards and other salvage operations.

9 = Extractive

This class includes all mineral extraction, oil extraction, gas extraction and associated surface and subsurface storage facilities.

10 = Transportation General

This class includes private airports, railroads, freeways, and harbor facilities.

11 = Transportation Institution

Anchorage Municipal airport and Anchorage Harbor were the only facilities mapped in this class.

INTEGRATED TERRAIN UNIT MAP
DATA CODE DESCRIPTIONS

INTERPRETED VARIABLES

-LANDFORMS

Landform types are ordered by alpha code. Some alpha codes and descriptions reference more than one numeric code in Appendix A.

Bx - BEDROCK
In-place rock that is overlain by unconsolidated material or exposed at the surface.

C - COLLUVIAL DEPOSITS
Deposits of widely varying composition that have been moved downslope chiefly by gravity. Fluvial slopewash deposits are usually intermixed with colluvial deposits.

Cl - Landslide
A lobe- or tongue-shaped deposit of rock rubble or unconsolidated debris that has moved downslope. Includes rock and debris slides, slump blocks, earth flows and debris flows.

Cs - Solifluction Deposits
Solifluction deposits are formed by the slow downslope, viscous flow of saturated soil material and rock debris in the active layer. Frost creep is also a major component in forming these deposits.

Ct - Talus
Deposits of angular rubble and rock fragments accumulated by gravity at the base of cliffs and steep slopes.

E - EOLIAN DEPOSITS
Materials deposited by wind.

El - Loess
Silt deposited by wind.

Es - Eolian Sand
Sand deposited by wind as sheets or discrete hills (dunes).

F - FLUVIAL DEPOSITS
Materials deposited by running water, such as rivers and streams.

Ff - Alluvial Fan
A gently sloping cone generally composed of granular material with varying amounts of silt deposited upon a plain by a stream where it issues from a narrow mountain valley. Can include varying proportions of avalanche or mudflow deposits, especially in mountainous regions.

Ffg- Granular Alluvial Fan
Used for granular alluvial fans. Not used for fans that contain significant amounts of incorporated colluvium such as avalanche and mudflow deposits.

Fp - Floodplain
Deposits laid down by a river or stream and flooded during periods of highest water in the present stream regimen. Floodplains are composed of two major types of alluvium: 1) Fp-r, generally granular riverbed (lateral accretion) deposits; and 2) Fp-c, generally finegrained cover (vertical accretion) deposits laid down above the riverbed deposits by streams at bank overflow (flood) stages.

Ft - Terrace
Relatively flat or gently inclined surface resulting from the dissection of former floodplains. To be used only when the terrace surface is high enough not to be flood prone.

G - GLACIAL DEPOSITS
Deposits formed in direct contact with glacial ice. This unit is used to map undifferentiated glacial deposits such as complex glaciofluvial deposits and till (G+GF) and water-worked till.

Gm - Moraine
Irregular topography in till of discontinuous ridges, knolls and hummocks surrounding closed depressions.

Gt - Till Sheet
A heterogeneous deposit laid down by glacial ice and composed of materials varying from clay to boulders.

Gtl- "Lowland" Till
This unit is used for the more poorly drained depressions and lower slopes on till sheets. Generally covered with open or dense black spruce and ground vegetation suited to seasonally wet conditions.

GF- GLACIOFLUVIAL DEPOSITS
Deposits laid down by streams flowing on, in or from glaciers.

GFl- "Lowland" Glaciofluvial Deposits
Used for the more poorly drained phases of alluvial glacial deposits generally characterized by nearly level surfaces. This unit is typically covered with open or dense black spruce and ground cover suited to seasonally wet conditions.

GFo- Outwash
Relatively level floodplain laid down by a stream which originated from a present or former glacier.

GFe- Esker Deposits
Long ridges of granular ice-contact deposits formed by streams as they flow on or under a glacier.

GFk- Kame Deposits
Hills and masses of granular ice-contact deposits formed by streams as they flow on or under a glacier.

I - IGNEOUS BEDROCK
Bedrock formed by solidification of hot magma. Refer to discussion under bedrock (Bx) for description of modifiers used for all igneous bedrock landforms.

Ig - Granite
A light-colored, coarse-grained plutonic rock. Also included are all other intrusives, e.g., gabbro, etc.

L - LACUSTRINE DEPOSIT
Generally fine-grained materials laid down in glacial and nonglacial lakes.

M - MARINE DEPOSITS
Materials laid down under an ocean and along its coasts. Includes coastal plain deposits.

Mb - Beach Deposits
Predominantly coarse-grained materials laid down along coasts. Includes marine (and lacustrine) beach ridges and other coarser-grained littoral and intertidal deposits. Emerged beach deposits that still preserve their surface morphology are also included.

Mt - Tidal Flat
Area of nearly flat, barren mud or sand periddically covered by tidal waters.

Mts- Recently Emerged Tidal Flat
Includes portions of tidal flats that have experienced recent uplift. Generally less subject to tidal innundation and more vegetated that Mt.

Mf - Emerged Fine-grained Marine (Esturine) Deposits
Finer-grained facies of marine (predominantly esturine) deposits which have emerged and now display mature subaerial features such as large relative uplift, sediment oxidation, groundwater freshening, dissection and burial by other terrestrial deposits, etc.

MG- GLACIOMARINE DEPOSITS
A complex of marine, glacial, and lacustrine deposits generally containing a large fraction of silt and clay sized material. These sediments were likely deposited in shallow marine or estuarine waters in an areal complex of submarine till sheets, ice rafted deposits, and quiescent water deposits.

MG1- "Lowland" Glaciomarine Deposits
Used for the more poorly drained phases of glaciomarine deposits that occur in depressions and gentle slopes. Generally vegetated with open or dense black spruce and ground cover suited to seasonally wet conditions.

N - METAMORPHIC BEDROCK
Bedrock modified from other rocks through changes in chemical environment, temperature or pressure. Refer to discussion under bedrock (Bx) for description of modifiers used for all metamorphic bedrock landforms.

O - ORGANIC DEPOSITS
Deposits of humus, muck and peat generally occurring in bogs, fens and muskegs.

W - WATER OR ICE
May be used for mapping water bodies. This designation may also be used for portions of borings drilled through streams or lakes or on ice. Not used for buried massive ice zones which are included in the landform types in which they occur. For glaciers see Gg.

? - UNKNOWN ORIGIN
Complex or buried deposits for which insufficient information is available to allow classification. Is also used as a modifier to another landform type or terrain unit symbol to indicate lower confidence.

-VEGETATION

FOREST AND WOODLAND (≥ 10% Crown Cover)

Closed Forest

21 - Coniferous Forest, White Spruce, Short Stands
Main canopy usually less than 30 ft in ht., usually found at higher elevations as isolated pockets in areas dominated by alder, grassland or open mixed stands.

22 - Deciduous Forest, Mixed Forest, Young Stands
Canopy is usually very finely textured as seen from above, openings in stand are very rare. Composed mostly of birch and/or aspen. This type very rarely mixed with other types except when found as remnant condition in burned areas. Spruce is not usually evident as a component of the overstory in these young stands. 0 - 40 years old.

24 - Deciduous Forest, Mixed Forest, Medium-Aged Stands
Canopy is usually fine textured as seen from above, openings may be fairly common but they are usually small. Elements of this type include birch, spruce and aspen. Birch is usually found as a main component of this type but % composition may vary greatly depending on a number of factors, eg., as the type increases in age, the percentage of white spruce as a crown component usually increases along with the amount of understory and number of stand openings. 40 - 100 years old.

25 - Coniferous Forest, White Spruce, Tall Stands
Main canopy usually greater than 30 ft. in ht., usually found at lower elevations on better sites, almost always found mixed with old and decadent deciduous trees (very rarely found as pure type).

26 - Deciduous Forest, Mixed Forest, Old Stands
Canopy is usually somewhat coarse textured as seen from above, openings are usually common and may cover close to half of the stand area. Canopy may also appear smooth, but openings appear as definite holes in the crown. Deciduous Trees in these old stands are usually decadent. Spruce is usually becoming the dominant species. The understory component of the stand is usually visible from above and includes Calamagrostics and Alnus as its most common species. These stands are always greater than 100 years old.

27 - Cottonwood, Young Stands
Most commonly found on new islands, downstream ends of old islands and point bars of rivers. Cottonwood or poplar is usually found mixed with large alder and/or willow - (understory is sparse to nonexistent). 40 years old.

28 - Cottonwood, Medium-Aged Stands
Most commonly found in riverine situation or within at least one mile of a river (alluvial soils). Stands are usually pure cottonwood or poplar, spacing is even and crown closure approaches 100%. Understory is dominated by alder and devil's club. 40 - 100 years old.

29 - Cottonwood, Old Stands
Most commonly found in riverine influence (alluvial soils). Stands may be mixed with young white spruce. Cottonwood are extremely large (30-40 inches in diameter) and decadent (larger trees may only be shells). Stand appears somewhat clumpy due to openings appearing in stand. Understory includes large quantities of alder, devil's club and willow. Greater than 100 years old.

Open Forest - Woodland (10-50% Crown Cover)

31 - Coniferous Forest, White Spruce, Short Stands
Usually found at higher elevations as a transition type between closed forest and high elevation nonforest areas. Usually found mixed with elements of the higher elevation type, ie., if the higher elevation type is a mixture of alder and grass then the open white spruce transition type will normally be forming a complex type with alder and grass. 30 feet tall.

32 - Deciduous Forest, Mixed Forest, Medium-Aged Stands
Similar to type 31 except normally found at lower elevations (as elevation increases so does proportion of spruce in mixed types). Although birch/aspen stands are not usually found as a transition type between forest and high elevation nonforest areas, they are often found just below areas of type 31. 40 years old.

33 - Coniferous Forest, White Spruce, Tall Stands
Same as type 31 except normally found at lower elevations or on better sites. Commonly found in creek bottoms mixed with alder/willow and grass. 30 feet tall.

34 - Deciduous Forest, Mixed Forest, Old Stands
Found in same general location as type 33. Found in association with grass and alder. Birch, in this type, is usually found growing in very small, tight clumps. Spruce are usually found to have an open grown form and are normally much younger than the hardwood component of the type.

35 - Cottonwood, Medium-Aged Stands
Usually found at treeline just above elevational limit of open white spruce. Found in pockets among low shrubs.

36 - Cottonwood, Old Stands
Two elevational phases of this type seem to occur. The high elevation phase, consisting of balsam poplar, may be found mixed with streamside alder/willow along flowing water on high elevation flats. The low elevation phase, consisting of cottonwood, may be found on major river flood plains growing with a confusing mixture of other types including open spruce, open birch, alder, grass, etc.

Closed Forest -Black Spruce Mountain Hemlock (≥ 10% Crown Cover)

41 - Black Spruce, Short Stands
Main canopy usually less than 30 ft. in ht., generally found on wet and/or cold (poor) sites, may be found mixed with birch of poor quality but usually found as a pure type forming islands and stringers in bog areas or transition zones between bog area and forest areas. Understory is usually a thick moss and/or sedge mat.

42 - Black Spruce, Tall Stands
Main canopy usually greater than 30 ft. in ht., can usually be identified as a fire formed stand, on relatively good sites, stands are remarkably pure and the stocking density is usually quite high, may be found mixed with very scattered birch.

45 - Mountain Hemlock, Short Stands
Main canopy less than 30 ft., geographically limited, found as stringers mixed with other local types. Not mapped.

46 - Mountain Hemlock, Tall Stands
Main canopy greater than 30 ft., geographically limited, found as stringer stands mixed with other local types. Not mapped.

Open Forest-Woodland, Black Spruce (10-50% Crown Cover)

43 - Black Spruce, Short Stands
Found in association with bog types. Black spruce are usually of very poor form. Site is either wet or cold or both - trees usually less than 15 ft. in height.

NON-FORESTED

Salt Water Wetlands

50 - Salt Grassland
Dominated grassland in areas of tidal influence. Usually found at edge of normal high water in sandy soil. Normally this type is found in areas where the shoreline gradient is relatively steep, usually found as a belt of grass along the shore.

51 - Low Shrub
Dominated shrubland located on tidal flats. Water level is usually fluctuating seasonally. In areas that are continuously wet, sedge replaces Myrica.

52 - Tidal Marsh
Usually found in areas with many shallow lakes and little topographic relief (within tidal influence). Vegetation is dominated by various sedges. Woody plants may occur on the drier sedge and peat ridges that are common to this type.

Tall Shrubs

60 - Alder
This type is dominated by tall (10-15ft) alder growing in dense thickets with grasses, ferns, and a great variety of forbs growing in the understory. Devil's club can be found as a dominant understory to the alder on wetter and steeper sites. Devil's club will normally exclude other understory vegetation. The type is found at or above treeline. At treeline it is often found mixed with open white spruce and cottonwood types.

61 - Alder-Willow (Stremside Vegetation)
This type is dominanted by a mixture of very large alder and willow. This type is normally found on frequently flooded ground such as new islands, point bars, etc. Understory is sparse but may include equisetur and calanagrostis. This type is often found mixed with young open cottonwood (in younger stands the cottonwood is almost indistinguishable from the willow and alder).

Low Shrub

62 - Willow Resin Birch
This type is dominated by either willow or resin birch or a combination thereof. The type is often found in sheltered situations at high elevations, eg., draws in mountainous terrain. This type is found at and above the transition between tall shrubland and tundra.

Grassland

63 - Upland Grass
This type is dominanted by Calamagrostics 1 to 2 meters tall. Fireweed and various ferns are sometimes common. This type is most often found as an understory in the more open forest types and woodland areas where it is commonly associated with alder patches. This type can also be found unassociated with other types along small streams.

Tundra

64 - Sedge - Grass
This type is found above treeline on relatively flat, wet areas. Vegetation consists almost entirely of various wet sedges.

65 - Herbacious
This type is found above treeline and is almost always found mixed with and above shrub tundra. The variety of species found in this type is immense, consisting mainly of various grasses and forbs. Soil varies in depth and may be intermixed with rock outcroppings. Vegetation may not be continuous.

66 - Shrub
This type is dominated by dwarf arctic birch and other shrubs along with various short grasses and a large number of forbs. This type is almost always found mixed with and below herbacious tundra. Density of the shrubs found in this type varies considerably and may often appear quite patchy.

67 - Mat and Cushion
This type is dominated by such plants as dryas, crowberry, bearberry, sedge, grass, lichen and other rooted forbs. Climatic conditions are extreme at the elevation where this type is found. Vegetation cover may be complete (closed mat cushion) or relatively sparse (scattered mat cushion) with a

large percentage of the vegetation being lichen. This type is often mixed with rock.

Freshwater Wetlands

68 - Sphagnum Bog
Cover is dominated by varying amounts of sedge, equisetum and moss (especially sphagnum). This type is usually found as a floating mat over several feet of water or as a thick mat directly over saturated or frozen soil. Shrubs and stunted trees (if present) may be found on drier peat ridges. (This type is similar to tidal marsh except that shallow lakes are less common, the peat ridges form a more continuous and regular pattern and the type is found inland beyond tidal reach. Usually found as a pure type).

69 - Sphagnum-Shrub Bog
Vegetation of this type is dominated by a thick moss mat (sphagnum) and/or sedge tussocks. Grass, ericaceous shrubs, salix, blueberry and cranberry may also be present. Ground water level usually varies seasonally but this type is usually mixed with open stands of short black spruce. Many other types may also be found in close association with sphagnum shrub bog. The associated types are usually found on glacial morraines and eskers within the bog area.

Cultural Features

70 - Cultural Influences
May be broadly defined as land that has been obviously affected by human activity. Includes agricultural land, urban areas, and land developed to support or provide services to agricultural and urban land. This "type" may indeed be vegetated but vegetation that is present may not be natural in either composition or spacing.

Barren

80 - Mud Flats
Confined to tidal areas (Cook Inlet...) and the mouths of major rivers (Knik...). This "type" may appear vegetated on CIR and color photography or from the air, however, the "vegetation" is usually algal blooms, and/or other sea plants. Mud flats are usually well patterned with ripple marks or water drainage patterns. They are normally submersed during high tide. They may be used as resting and feeding areas by waterfowl.

81 - Rock
Includes exposed bedrock and scree commonly found along with mat cushion tundra at high elevations. This "type" is also used to describe large landslide areas - some morrainal features and other natural barren areas.

Permanent Snow and Ice

82 - Snowfield
High elevation snow accumulation areas. Appears to be a permanent or nearly year round part of the landscape. May be found as small pockets on slopes protected from the sun, on lee slopes or in gulleys. Usually found over bare ground. May also be found as large snow accumulation areas at very high elevations. Often mixed with mat-cushion tundra and rock.

83 - Glacier
Includes both icefields and glaciers. Usually found covering several square miles. Considered a permanent part of landscape. To differentiate 83 from 82, note 83 covers much larger areas; crevasses, morraines and other glacial features are usually present.

-SURFICIAL GEOLOGY

Coarse-Grained Surficial Deposits

11 = an — Alluvium of the Anchorage plain. Gravel and sand, generally well bedded and well sorted. Chiefly gravel in the eastern part of the map area, grading into sand westward; chiefly sand at Spenard and Turnagain Heights. At western end of the deposit the sand grades imperceptibly into material mapped as unit sl. Commonly overlaid by 1-5 feet of silt similar to silty material mapped as unit s, but in built-up areas much of this silt has been removed.

12 = al — Alluvium in abandoned stream channels and in terraces along modern streams. Gravel and sand, generally well bedded and well sorted. Deposits in large channels and in other broad areas are chiefly gravel and are thicker than deposits in small narrow channels and terraces, which contain chiefly sand and gravel; some channels and broad areas on the map overprinted by the red line pattern (peat) contain significant amounts of silt and clay.

13 = af — Deposits in alluvial fans, alluvial cones, and emerged deltas. Dominantly gravel in most areas, but mostly sand with conspicuous coal fragments between Point Woronzof and Point Campbell. Generally well bedded and well sorted except for small alluvial cones in the mountains where the material is less well sorted and contains some silt and clay. These latter deposits are contiguous with and grade into materials mapped as unit c.

14 = ga — Glacial alluvium in irregular-shaped hills (including kames, eskers, and kame terraces) deposited in and near glacier ice; includes similar deposits that may be marine rather than glacial in origin. Chiefly gravel and sand, moderately well sorted; includes some beds of diamicton, and generally consists of more heterogeneous materials than other alluvial deposits. In places materials mapped as unit ga are difficult to distinguish from materials mapped as units m and mg.

15 = sh — Sand deposits in broad low hills, and windblown sand deposits in cliffhead dunes near Point Campbell. Almost exclusively sand, very well sorted and well bedded. The broad low hills are generally underlain by the Bootlegger Cove Clay (bc) at depths of 40 feet or more. Deposits of unit sh commonly are well drained.

16 = sl — Sand deposits in wide low-lying belt centered around Connors Lake. Chiefly sand, well bedded and well sorted, and small amounts of gravel; commonly contains coal fragments. Deposits grade laterally into material mapped as unit an from which it is not readily distinguishable. Contacts with materials mapped as units bc and s are not well defined; the deposits are probably complexly interrelated. Generally underlain by Bootlegger Cove Clay (bc) at depths of 20 feet or less and overlain by varying thicknesses of peat. Deposits of unit sl are commonly poorly drained. Includes small patches of modern beach sand.

Fine-Grained Surficial Deposits

21 = //// — Peat. Many relatively low lying areas are covered by a few feet of peat. This overprint pattern is used in conjunction with other map units where the peat is probably more than 2 feet thick. Peat commonly ranges from 5 to 10 feet thick and in places it is as much as 30 feet thick. Pond deposits (l) may occur at the base of the peat. Peat commonly is removed or buried by fill during construction and urban development, but such areas are not shown on the map.

22 = l — Lake and pond sediments. Lowland deposits, exposed in few places, are chiefly silt and clay, with some marl; may be considerably thinner than overlying peat deposits. Near the mountains chiefly silt and clay with some fine sand, and sand and gravel; accumulated in former ice-dammed lakes; may be several tens of feet thick.

23 = s — Silt. Near International Airport fine sand and some clay interbedded locally where the deposits, which may be more than 40 feet thick, occur in irregular hills. The boundary with materials mapped as unit sl is approximate; the two types of material may grade into one another. Between Point Woronzof and Point Campbell the deposit includes clay and is somewhat similar to material mapped as Bootlegger Cove Clay (bc), but is only about 10 feet thick; materials similar to adjacent deposits mapped as unit af underlie unit s. Also includes sediments in the tidal zone and in adjacent areas no longer or only rarely covered by tidal water

24 = bc — Bootlegger Cove Clay. Chiefly clay and silt, locally containing pebbles, cobbles, and boulders. Near Anchorage exposed mostly in sea bluffs and valley walls; extends continuously at depth from near Cairn Point to an area of surface exposure at Turnagain Arm. Thicknesses of about 60 feet of the Bootlegger Cove Clay are exposed in the sea bluffs, but in the central part of the lowland area wells penetrate as much as 200 feet. Interbeds of fine sand are generally thin in the north, but thicker beds of sand in the south are similar to materials mapped as unit sl; there the boundary between the two deposits is obscure. The western margin of this deposit interfingers at depth with material mapped as unit af, and on the east side it may merge at depth with material mapped as unit mg.

Mixed Coarse- and Fine-Grained Surficial Deposits

31 = m — Morainal deposits generally in long ridges marking the margins of former glaciers. The topography on the Elmendorf Moraine in the northern part of the map area is notably hummocky, whereas the topography north of the moraine and along the mountain front is more subdued. Chiefly till, including diamicton and poorly sorted gravel; better sorted gravel and sand may be present locally; the deposit is not everywhere clearly distinguishable from materials mapped as unit ga.

32 = gm — Glacial and (or) marine deposits, typically in elongate hills. These features consist chiefly of diamicton, but they include some beds of fine sand and silt; thin beds of gravel and sand occur locally. May grade into deposits mapped as unit mg.

33 = mg — Marine, glacial, and (or) lacustrine deposits, typically in broad low areas adjacent to the hills mapped as unit gm, and in isolated hills farther west; deposits consist of a variety of interbedded materials that generally have much fine-grained sand, and some clay. Silty materials are more common in the eastern part of the map unit and sandy materials in the weste n part. The isolated hills are the intermediate member of a series, the end members of which are the sharply defined hills mapped as unit gm (diamicton) to the east, and the broad low hills mapped as unit sh (sand) to the west. It is not always possible to determine precisely into which of these three map units the materials in some of the intermediate hills should be placed. In addition, some of the hills may contain silt and clay resembling Bootlegger Cove Clay (bc).

34 = c — Colluvium (slope deposits). Extensive deposits on mountain sides and in narrow bands along sea bluffs and valley walls in the lowland. Chiefly diamicton and poorly sorted to well-sorted gravel with some sand, silt, and clay; crude bedding is common parallel to the slope. The material reflects the composition of upslope deposits. Bedrock (b) may be encountered locally at shallow depth in the mountains; the boundary with bedrock (b) is actually a broad zone approximated by the contact on the map.

35 = ls — Deposits of landslides of the 1964 earthquake and older landslides, chiefly block-glides. Most of the slides involved large blocks consisting of beds of gravel and sand (an) lying on beds of clay and silt (bc). These blocks moved laterally from their original positions behind former bluffs to new locations at lower elevations. In places the blocks moved intact and so remain, but particularly at the outer parts of the slides most of the blocks broke into heterogeneous mixtures of gravel, sand, silt, and clay.

36 = f — Manmade fill. Chiefly gravel and sand, but includes some silt-and clay-size material. Mapped only where unusually high embankments or very broad fills were emplaced.

Bedrock

41 = b — Metamorphic rocks, principally the McHugh Complex comprising weakly metamorphosed siltstone, graywacke, arkose, conglomeratic sandstone, and greenstones commonly associated with chert and argillite. Near the mouth of Little Rabbit Creek, rocks of another complex include marble, greenstone, and cherty argillite. These descriptions

are based on recent mapping by S.H.B. Clark (written commun., 1972). Bedrock locally is mantled by colluvium (c) and by morainal deposits (m); the boundary between bedrock and adjacent deposits is commonly a broad zone only approximated by the contact on the map.

99 = Water

-SLOPE

The same slope classes were chosen to be mapped on the terrain units that were mapped as phase breaks in SCS soil surveys.

1 = 0 - 3% - Nearly level

2 = 3 - 7% - Undulating, gently sloping

3 = 7 -12% - Rolling

4 = 12-20% - Hilly

5 = 20-30% - Moderately Steep

6 = 30-45% - Steep

7 = 45% and greater - Extremely Steep

9 = Water

Percent Slope	Angle of Inclination	Slope Ratio	Gradient (feet per mile)
3	1° 43'	33.3:1	158.4
7	4° 7'	14.3:1	369.6
12	6° 53'	8.3:1	633.6
20	11° 28'	5:1	1056
30	17° 11'	3.3:1	1584
45	25° 47'	2.2:1	2376

-SURFACE FORM

1 = Simple Surface - a single, continuous plane with only minor variations over the entire surface of the area. This plane may be flat, concave or convex in profile and/or transect.

2 = Undulating Surface - gently fluctuating plane in profile and/or transect; without angularity.

3 = Complex Surface - multiple changes of slope and aspect with angular or mixed breaks in slope.

8 = Water Body - lakes, reservoirs and rivers.

-SOILS

On the following pages each soil series in the Anchorage Area is described in detail. The series descriptions are presented in alphabetic order by series name.

For each series, some facts about the soil and its parent material are presented first. Then a pedon, a small three dimensional area of soil typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (U.S. Dept. Agr. Handbook 18, 1951). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series mapped in this survey area. Phases, or mapping units, of each soil series are described in the section "Descriptions of the Soils".

Anchorage Series

The Anchorage series consists of sandy, mixed Entic Cryorthods. These excessively drained soils are formed in deep sandy eolian deposits and occupy stabilized dunes. Slopes range from 0 to 60 percent.

The Anchorage soils are closely related to the Tuomi series which occupy some adjoining areas. The Anchorage soils contain a much higher proportion of sand than the Tuomi soils.

02--2 to 0 inches; very dark brown (10YR 2/2) partially decomposed moss fibers coated with yellowish brown silt; many fine and medium roots; abrupt wavy boundary; 1 to 4 inches thick.

A2--0 to 2 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

B2--2 to 7 inches; dark yellowish brown (10YR 4/4) fine sandy loam; patches and streaks of grayish brown and yellowish brown; weak fine granular structure; very friable; common fine roots; very strongly acid; clear wavy boundary.

C1--7 to 40 inches; olive (5Y 4/3) loamy fine sand; single grain; loose; few fine roots to 30 inches; very strongly acid; gradual boundary.

C2--40 to 54 inches; olive gray (5Y 4/2) loamy sand; single grain; loose; few pebbles and thin lenses of coarse sand.

The A2 horizon ranges from fine sand to silt loam in texture. The colors are usually gray, dark gray, grayish brown, or dark grayish brown masked with black finely divided organic matter.

The B2 horizon ranges from fine sand to fine sandy loam in texture. Colors are in hues of 7.5YR or 10YR; values of 4 or 5; and chromas of 4 to 6.

The C horizon is sand or loamy fine sand. In places the lower portions contain up to 15 percent gravel.

Caswell series

The Caswell series consists of coarse-loamy, mixed Sideric Cryaquods. These moderately well drained soils formed in silty and sandy waterlaid sediments over very gravelly sand. They occur on low terraces and in broad depressions. Slopes range from 0 to 7 percent.

The Caswell soils are closely related to the Moose River and Niklason soils which commonly occur in adjoining areas. The Caswell soils are not as poorly drained as the Moose River soils. They are not as well drained and have more strongly developed colors in the sub-surface horizons than the Niklason soils.

Typical pedon of Caswell silt loam on a nearly level alluvial plain in the SE1/4 SW1/4, Sec. 35, T13N, R3W. Seward Meridian:

O1--4 to 0 inches; very dark brown (10YR 2/2) partially decomposed organic material; many roots; abrupt smooth boundary.

A1--0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam; weak very fine granular structure; very friable; many roots; very strongly acid; abrupt smooth boundary.

A2--2 to 3 1/2 inches; dark grayish brown (10YR 4/2) silt loam; few fine prominent dark reddish brown mottles; weak very fine granular structure; very friable; many roots; very strongly acid; abrupt wavy boundary.

B21--3 1/2 to 5 inches; dark reddish brown (5YR 3/4) sandy loam; moderate fine granular structure; common medium distinct grayish brown mottles; very friable; common fine roots; few fine concretions; very strongly acid; clear wavy boundary.

B22--5 to 11 inches; dark yellowish brown (10YR 4/4) fine sandy loam; common medium distinct grayish brown mottles; weak fine granular structure; very friable; few roots; very strongly acid; gradual boundary.

B3--11 to 19 inches; olive brown (2.5Y 4/4) fine sandy loam, common large faint dark grayish brown mottles; massive; friable; few thin strata of fine sand; few roots; very strongly acid; abrupt smooth boundary.

C1--19 to 27 inches; dark grayish brown (2.5Y 4/2) loamy fine sand; single grain; loose; few thin strata of silt loam, few pebbles; strongly acid; abrupt smooth boundary.

IIC2--27 to 42 inches; dark grayish brown (2.tY 4/2) very gravelly sand; single grain; loose; few discontinuous reddish brown, weakly cemented streaks and patches; few thin strata of silt and fine sand; about 40 percent gravel; strongly acid.

The weighted average texture of the stratified materials is fine sandy loam. Strata range from sand to silt loam in texture and vary in thickness, number, and arrangement in the profile. The very gravelly substratus contains 35 to 50 percent gravel by volume.

Colors of the A2 horizon are in hue of 10YR and have values of 4 or 5 and chromas of 1 or 2.

Colors in the B2 horizon are in hues of 5YR, 7.5YR and 10YR; they have values of 3 to 5 and chromas of 4 to 6.

Discontinuous horizontal and diagonal streaks of weakly cemented, iron-stained sandy materials are common in the very gravelly substratum.

Chena series

The Chena series consist of sandy-skeletal, mixed Typic Cryorthents. These soils are excessively drained, and formed in stratified silty and sandy alluvium less than 10 inches thick over loose very gravelly sand. They occupy alluvial fans and flood plains. Slopes range from 0 to 7 percent.

The Chena soils are closely related to the Kasilof and Niklason soils which commonly occupy adjacent areas on the landscape. The Chena soils have no developed subsurface horizons as in the Kasilof soils and are shallower in depth to very gravelly material than the Niklason soils.

Typical pedon of Chena silt loam, about 1100 feet west of railroad bridge across Eagle River and 100 feet north of riverbank on Fort Richardson in the NW1/4 SW1/4, Sec. 10, T14N, R2W, Seward Meridian:

O1--1 to 0 inches; black (10YR 2/1) partially decomposed forest litter; very strongly acid; abrupt smooth boundary.

C1--0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak medium platy structure; friable; common roots; common fine pores; very strongly acid; abrupt smooth boundary.

IIC2--3 to 44 inches; dark grayish brown (2.5Y 4/2) very gravelly sand; single grain; loose; about 50 percent gravel; very strongly acid.

The O horizon is thin and does not occur in all pedons. The texture of the material above the gravelly substratum ranges from silt loam to sandy loam. It is 2 to 10 inches thick.

The substratum contains 35 to 50 percent gravel, and up to 10 percent cobbles. Some pedons have thin discontinuous silty strata.

Clam Gulch series

The Clam Gulch series consists of fine-silty, mixed, nonacid Humic Cryaquepts. These soils are deep and poorly drained. They have dark silty A horizons over gray sediments that are moderately high in clay. They are formed in alluvium on flood plains and in depressions in glacial moraines. Slopes are 0 to 30 percent.

The Clam Gulch soils are closely related to the Goodhope and Kalifonsky soils that commonly occur in adjoining areas. The Clam Gulch soils are more strongly gleyed and mottled than the Goodhope soils. They are finer textured than the Kalifonsky soils.

Typical pedon of Clam Gulch silt loam under black spruce forest near Mirror Lake; NW1/4, SE1/4, Sec. 13, T15N, R1W, Seward Meridian:

O1--4 to 0 inches; dark brown (7.5YR 4/4) sphagnum moss; many fine, medium, and coarse roots; abrupt smooth boundary.

A1--0 to 5 inches; black (5YR 2/1) silt loam; dark grayish brown streaks, weak medium granular structure; friable, slightly sticky, nonplastic; few roots; strongly acid; abrupt wavy boundary.

B21g--5 to 11 inches; dark gray (10YR 4/1) silty clay loam, many medium distinct olive brown mottles; massive; friable, slightly sticky, slightly plastic; contains pockets and tongues of A1 material; strongly acid; gradual boundary.

B22g--11 to 36 inches; dark gray (10YR 4/1) silty clay loam; few medium faint brown mottles, massive; firm, slightly stickly, slightly plastic; medium acid; gradual boundary.

B3g--36 to 42 inches; olive (5Y 4/3) silty clay loam; many medium distinct dark gray mottles; massive; firm, sticky, plastic; medium acid.

The texture of the A horizon is commonly silt loam but in places it is silty clay loam. It ranges from 4 to 14 inches in thickness. Colors in the B horizon have hues of 5Y to 10YR, values of 4 or 5 and chromas of 1 to 3. Some profiles contain a few pebbles.

Cryaquents series

Cryorthents series

Doroshin series

The Doroshin series consists of loamy, mixed, dysic Terric Borohemists. These soils are moderately deep, very poorly drained, partially decomposed peat. They are underlain by either fine-grained lacustrine deposits or compact gravelly glacial till. They occur in depressions in moraines, at borders of muskegs, and in areas affected by seepage on moderate to strong slopes. Slopes range from 0 to 20 percent.

The Doroshin soils are closely related to the Jacobsen and Starichkof soils which commonly occupy adjoining areas. Doroshin peat is deeper to mineral materials than Jacobsen soils, but is not as deep as Starichkof peat.

Typical pedon of Doroshin peat, 300 feet east of Glenn Highway, 400 feet north of gravel pit, in the NE1/4 SW1/4 Sec. 25, T15N, R2W, Seward Meridian (reaction is determined in water suspension).

Oi1--0 to 14 inches; dark reddish brown (5YR 3/2, broken face) mixed moss and sedge peat, dark yellowish brown (10YR 4/4) pressed and rubbed; about 90 percent fiber, about 75 percent rubbed; weak coarse platy structure; friable; common roots; less than 5 percent mineral material; strongly acid.

Oe1--14 to 24 inches; very dark grayish brown (10 YR 3/2, broken face) partially decomposed moss and sedge peat, dark brown (10 YR 3/3) pressed and rubbed; about 60 percent fiber, about 25 percent rubbed; massive; friable; few roots; less than 5 percent mineral material; strongly acid; clear smooth boundary.

OE2--24 to 36 inches; very dark brown (10YR 2/2, broken face) partially decomposed moss and sedge peat, very dark grayish brown (10YR 3/2) pressed and rubbed; about 30 percent fiber, about 25 percent rubbed; massive, friable, about 10 percent mineral material; strongly acid; abrupt smooth boundary.

IICg--36 to 42 inches; dark greenish gray (5GY 4/1) silt loam; massive; friable, slightly sticky, nonplastic.

The organic materials range in thickness from 16 to 50 inches. Some pedons have a thin sapric layer immediately above the mineral contact. Texture of the mineral substratum ranges from silt loam to gravelly sandy loam.

Goodhope series

The Goodhope series consists of fine silty, mixed, acid Typic Cryorthents. These well-drained and moderately well drained soils formed in firm glacial till of moraines. Slopes range from 0 to 12 percent.

The Goodhope soils are closely related to the Clam Gulch soils which commonly occupy adjoining low areas. The Goodhope soils are not as poorly drained or as strongly mottled as the Clam Gulch soils.

Typical pedon of Goodhope silt loam, about 1/2 mile west of Birchwood in the SE1/4 SE1/4, Sec. 13, T15N, R2W, Seward Meridian:

O1--3 to 1 inches; dark reddish brown (5YR 2/2) partially decomposed forest litter; many fine roots; abrupt, smooth boundary. (1 to 3 inches thick)

O2--1 to 0 inches; very dark gray (10YR 3/1) sapric peat; many fine roots; abrupt, smooth boundary. (0 to 2 inches thick)

C1--0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; few, fine, prominent reddish brown mottles; weak, fine granular structure; very friable, slightly sticky, nonplastic; common, fine roots; strongly acid; clear, wavy boundary. (0 to 10 inches thick)

C2--3 to 10 inches; olive brown (2.5Y 4/4) silty clay loam; many large patches of dark grayish brown; weak, thin platy structure; friable, slightly sticky, slightly plastic; few fine roots; strongly acid (pH 5.4); gradual boundary. (0 to 10 inches thick)

C3--10 to 44 inches; olive brown (2.5Y 4/4) gravelly silty clay loam; many large light olive brown (2.5Y 5/4) and dark grayish brown (2.5Y 4/2) patches; massive; firm, sticky, plastic; 15 percent gravel; strongly acid.

The texture of the upper 10 inches is silt loam or silty clay loam. Matrix colors of moist soil in the upper 10 inches are in hues of 10YR or 2.5Y, with value of 4, and chromas of 2 to 4. Below the 10 inch depth, matrix colors for moist soil are in hues of 2.5Y or 5Y, values of 4 or 5, and chromas of 2 to 4. A few faint brown or gray mottles may occur in the upper 20 inches. Gravel content ranges from 0 to 20 percent by volume. In places there are a few stones and cobbles.

Gravel Pits

Grewingk series

The Grewingk series consists of coarse-loamy, mixed, micro Sideric Cryaquods. These somewhat pporly drained soils formed in glacial drift and colluvial materials on north-facing slopes of moraines that are affected by seepage. Slopes range from about 12 to 45 percent.

The Grewingk soils commonly adjoin areas of Homestead soils. The Grewingk soils are not as well drained as the Homestead soils.

Typical pedon of Grewingk sandy loam on a 30 to 45 percent north-facing slope in the NW1/4 NE1/4, Sec. 20, T14N, R1W, Seward Meridian.

O1--8 to 0 inches; dark reddish brown (5YR 2/2) partially decomposed organic matter derived mostly from mosses; many fine and medium roots; extremely acid; abrupt smooth boundary.

A2--0 to 1 inch; dark grayish brown (10 YR 4/2) silt loam; few medium distinct dark grayish brown mottles; weak fine granular structure; very friable; common roots; few rounded pebbles; very strongly acid; clear wavy boundary.

B3--3 1/2 to 6 inches; olive brown (2.5Y 4/4) sandy loam; common medium distinct brown mottles and few patches of dark grayish brown; weak fine granular structure; very friable; few roots; very strongly acid; cleary wavy boundary.

C--6 to 33 inches; olive gray (5Y 4/2) gravelly loam; common large distinct olive brown mottles with diffuse boundaries; massive; friable, slightly sticky, slightly plastic; few roots to 18 inches; estimated 15 to 25 percent gravel and 10 percent cobblestones; strongly acid.

Under a thick surface mat of moss and forest litter the soil commonly remains frozen until late summer. Some pedons have a thin black A1 horizon.

The texture of the A and B horizon ranges from sandy loam to silt loam and gravel content ranges from 0 to 15 percent. The color of the B2 horizon is in hues of 5YR, 7.5YR, or 10YR with values of 3 or 4 and chromas of 3 or 4. Texture of the C horizon ranges from fine sandy loam to gravelly loam, gravel content ranges from 0 to 25 percent, and cobblestones from 0 to 10 percent. The C horizon in some pedons is roughly stratified and in places contains a few thin strata of sand and fine gravel.

Homestead series

The Homestead series consists of loamy-skeletal, mixed Typic Cryorthods. These soils are somewhat excessively drained to well-drained and formed in 50 to 20 inches of silt loam loess over very gravelly till. They occur on moraines with slopes ranging from 0 to 75 percent.

The Homestead soils are closely related to the Grewingk, Kasilof, Purches, and Tuomi soils which commonly occupy adjoining areas or similar positions on the landscape. The Homestead soils, which are well drained, are not mottled like the somewhat poorly drained Grewingk and Purches soils. They have a higher proportion of fine material in the substratum than the Kasilof soils and contain a higher proportion of gravel than the Tuomi soils which are formed in stratified drift.

Typical pedon of Homestead silt loam on a rolling moraine with 7 to 12 percent slopes, under a forest dominated by paper birch and white spruce in the NW1/4 NE1/4, Sec. 4, T12N, R3W, Seward Meridian:

O1--2 to 0 inches; very dark brown (10YR 2/2) partially decomposed forest litter; many fine and medium roots; very strongly acid; abrupt smooth boundary.

A2--0 to 1 1/2 to 7 1/2 inches; brown (7.5YR 4/4) silt loam, moderate fine granular structure; very friable; few pebbles; many fine and medium pores; many fine roots; strongly acid; clear wavy boundary.

B21--1 1/2 to 7 1/2 inches; brown (7I5YR 4/4) silt loam; moderate fine granular structure; very friable; few pebbles; many fine and medium pores; many fine roots; strongly acid; cleary wavy boundary.

B22--7 1/2 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable; few pebbles; many fine and medium pores; common roots; strongly acid; clear smooth boundary.

IIC--14 to 48 inches; dark grayish brown (10YR 4/2) very gravelly sandy loam; massive; firm in place; friable when disturbed; about 50 percent coarse gragments; a few discontinuous strata of sand occur at lower depths; few roots to 24 inches; strongly acid.

The silt loam loess is about 5 to 20 inches thick. Soils with loess less than 10 inches thick are mapped as a very shallow phase of the Homestead series. The substratum contains about 35 to 50 percent coarse fragments; a few discontinuous strata of sand occur at lower depths; few roots to 24 inches; strongly acid.

The silt loam loess is about 5 to 20 inches thick. Soils with loess less than 10 inches thick are mapped as a very shallow phase of the Homestead series. The substratum contains about 35 to 50 percent gravel, 0 to 15 percent cobblestones, and 0 to 15 percent large stones and boulders.

The dominant colors in the upper part of the B horizon have a hue of 7.5 YR with chroma and value of 4/4, 3/4, 5/6, or 5/4. The colors range to hues of 5YR or 10YR with a value of 4 and chromas of 3 or 4. Patches and streaks of yellowish brown and reddish brown are common. Thickness of the solum ranges from 8 to 14 inches. In very shallow soils the lower portion of the spodic horizon commonly extends into the very gravelly substratum.

Jacobsen series

The Jacobsen series consists of loamy-skeletal, mixed, acid Histic Cryaquepts. These poorly drained soils are formed in very stony glacial till and occupy drainageways, shallow depressions, and low-lying areas bordering muskegs. Slopes range from 0 to 7 percent.

The Jacobsen soils are closely related to the Doroshin, Kalifonsky, and Torpedo Lake soils which commonly occupy adjoining areas. The peaty materials on the surface of Jacobsen soils are not as thick as those in Doroshin peat. Jacobsen soils have thicker and darker surface layers, and contain a much higher proportion of stones than the Kalifonsky soils. They are more stony and less plastic than the Torpedo Lake soils.

Typical pedon of Jacobsen very stony silt loam in a nearly level area in the NW1/4 SW1/4, Sec. 2, T12N, R3W, Seward Meridian:

O1--12 to 6 inches; dark reddish brown (5YR 2/2) partially decomposed sphagnum moss peat; many fine and medium roots; extremely acid; clear smooth boundary.

O2--6 to 0 inches; black (5YR 2/1) well-decomposed organic material; many fine and medium roots; very strongly acid; clear wavy boundary.

A1--0 to 8 inches; black (10YR 2/1) very stony silt loam, massive; friable, nonsticky, nonplastic; few roots; 35 percent stones and cobblestones; 20 percent gravel; very strongly acid; gradual smooth boundary.

Bg--8 to 34 inches; very dark gray (5Y 3/1) very stony sandy loam; common, medium faint dark gray mottles and common fine prominent brown mottles, massive; firm, nonsticky, nonplastic; 40 percent stones and cobblestones, 20 percent gravel; very strongly acid.

The water table is usually less than 2 feet below the surface. Stones, cobbles, and gravel make up 40 to 70 percent of the soil volume. The O horizon ranges from 8 to 15 inches in thickness. The A horizon ranges from 2 to 10 inches in thickness and from very stony silt loam to very stony sandy loam in texture.

Kalifonsky series

The Kalifonsky series consists of coarse-silty over sandy or sandy-skeletal, mixed, acid Typic Cryaquepts. These poorly drained soils occur in broad shallow basins and in areas bordering muskegs. They are formed in 15 to 30 inches of silt loam over a substratum of very gravelly sand. Slopes range from 0 to 12 percent.

The Kalifonsky soils are closely related to the Clam Gulch and Jacobsen soils that commonly occur in adjoining areas. The Kalifonsky soils are not as fine-textured as the Clam Gulch soils and not as stony as the Jacobsen soils.

Typical pedon of Kalifonsky silt loam in slight depression on a terrace in the NE1/4 NE1/4, Sec. 20, T14N, R1W. Vegetation is forest dominated by black spruce, willow, and paper birch.

O1--3 to 0 inches; dark reddish brown (5YR 2/2) partially decomposed organic matter; many fine roots; abrupt smooth boundary.

A1--0 to 2 inches; very dark grayish brown (10 YR 3/2) silt loam; weak fine granular structure; friable, nonsticky , nonplastic; many roots; very strongly acid; abrupt wavy boundary.

B1g--2 to 6 inches; dark grayish brown (10YR 3/2) silt loam; common large faint gray mottles and few medium distinct reddish brown mottles; weak thin platy structure; friable, nonsticky, nonplastic; common roots; very strongly acid; gradual boundary.

2g--6 to 23 inches; dark gray (10YR 4/1) silt loam; common medium istinct olive brown and olive gray mottles; weak thin platy structure; nonsticky, nonplastic, few roots; very strongly acid; clear mooth boundary.

IC--23 to 40 inches; olive gray (2.5Y 4/2) very gravelly sand; ingle grain; loose; 60 to 70 percent rounded gravel and cobblestones.

he silt loam is 15 to 30 inches thick over gravelly sand.

asilof Series

he Kasilof series consists of sandy-skeletal, mixed, micro Typic ryorthods. These soils are excessively drained. They have thin podic horizons developed in a silty loess mantle less than 10 inches hick over loose very gravelly sand. They occur on alluvial fans nd stream terraces. Slopes range from 0 to 30 percent.

he Kasilof soils are closely related to the Chena, Homestead, and urches soils which commonly occupy adjoining areas on the landscape. he Kasilof soils have more strongly developed subsoil colors than he Chena soils. They contain a higher proportion of sandy material n the very gravelly substratum than the Homestead soils and lack ottles associated with wetness that are typical of the Purches soils.

ypical pedon of Kasilof silt loam in SW1/4 NW1/4, Sec. 22, T14N, 3W, Seward Meridian:

1--3 to 0 inches; dark reddish brown (5YR 2/2) partially decomposed orest litter; very strongly acid; abrupt smooth boundary.

2--0 to 1 1/2 inches; dark gray (10YR 4/1) silt loam; weak medium laty and weak fine granular structure; very friable; very strongly cid; abrupt smooth boundary.

2--1 1/2 to 4 inches; dark brown (7.5YR 4/4) silt loam; weak edium granular structure; few pebbles; very friable; strongly acid; radual wavy boundary.

3--4 to 7 inches; dark brown (10YR 4/3) gravelly loam; weak fine ranular structure; about 20 percent gravel; very friable; strongly cid; gradual wavy boundary.

IC1--7 to 40 inches; dark olive gray (5Y 3/2) very gravelly sand: bout 60 percent gravel; single grain; loose; strongly acid.

ome pedons have a thin, dark silt loam A1 horizon. Depth to the ase of the spodic horizon ranges fron 4 to 7 inches. The B3 horizon some pedons contains 20 to 35 percent gravel. Coarse fragments in he IIC horizon range from 45 to 60 percent gravel and 0 to 7 percent obbles.

Moose River series

The Moose River series consists of coarse-loamy, mixed, acid Typic Cryaquents. These poorly drained soils occur on flood plains and low-lying areas on outwash plains. They are formed in stratified silty and sandy alluvial sediments. Slopes are 0 to 3 percent.

The Moose River soils are closely related to the Caswell and Niklason soils which commonly occupy adjoining areas. The Moose River soils have higher water tables and are much more poorly drained than the Caswell and Niklason soils.

Typical pedon of Moose River silt loam on a nearly level flood plain in the NE1/4 NW1/4, Sec. 21, T14N, R2W, Seward Meridian:

O1--2 to 0 inches; very dark grayish brown (10YR 3/2) partially decomposed forest litter and moss with admixture of gray silt; many roots; abrupt smooth boundary.

C1g--0 to 4 inches; dark gray (10YR 4/1) silt loam; patches and streaks of very dark grayish brown; weak fine granular; friable, nonsticky, nonplastic; many roots; very strongly acid; abrupt smooth boundary.

C2g--4 to 8 inches; dark gray (5Y 4/1) fine sandy loam; common, medium, distinct dark brown mottles; weak fine granular; friable, nonsticky, nonplastic; few roots; very strongly acid; abrupt smooth boundary.

C3g--8 to 14 inches; dark gray (5Y 4/1) loamy fine sand; single grain; loose; few roots; strongly acid; abrupt smooth boundary.

C4g--14 to 42 inches; dark greenish gray (5GY 4/1) fine sandy loam; massive; friable, nonsticky, nonplastic; many thin strata of loamy fine sand; few rounded pebbles; strongly acid.

The weighted average texture of the C horizons ranges from sandy loam to silt loam. Strata vary in thickness, number, and arrangement in the profile. Gravel content ranges from 0 to 35 percent. The water table is commonly within one foot of the surface.

Niklason series

The Niklason series consists of coarse-loamy over sandy or sandy-skeletal, mixed, acid Typic Cryofluvents. These well-drained soils have no developed horizons and are formed in shallow and moderately deep silty and sandy alluvial sediments over very gravelly sand. They occur on nearly level flood plains and stream terraces.

The Niklason soils are closely related to the Caswell, Chena, and Moose River soils which commonly occur on adjoining areas. The Niklason soils lack the dark reddish brown mottled subsurface horizon developed in the Caswell soils. They are deeper to very gravelly sand than the Chena soils and do not have mottles associated with wetness which are typical of the Moose River soils.

Typical pedon of Niklason silt loam in the SE 1/4 SE1/4, Sec. 17, T14N, R1W, Seward Meridian:

O1--2 to 0 inches; dark reddish brown (5YR 2/2) partially decomposed organic matter; many roots; abrupt smooth boundary.

A1--0 to 2 inches; dark brown (10YR 3/3) silt loam; moderate fine granular structure; very friable; many roots; strongly acid; clear wavy boundary.

C1--2 to 18 inches; dark grayish brown (2.5Y 4/2) stratified silt loam and fine sand; silt loam has weak fine granular structure; sand is single grain; very friable or loose; few roots; strongly acid; abrupt smooth boundary.

IIC2--18 to 42 inches; dark grayish brown (2.5Y 4/2) very gravelly loamy sand; single grain; loose.

The depth to very gravelly sand ranges from 10 to 30 inches. The weighted average texture of the stratified silty and sandy sediments is silt loam or fine sandy loam. The strata of silty and sandy materials vary in thickness, number, and arrangement in the profile. Gravel content ranges from about 35 to 55 percent by volume in the substratum. Cobblestones make up 0 to 10 percent.

Purches series

The Purches series consists of loamy-skeletal, mixed Sideric Cryaquods. These moderately well drained to somewhat poorly drained soils formed in compact glacial till capped with a loess mantle. They occur in slight depressions in glacial moraines and on muskeg borders. They have slopes of 0 to 12 percent.

The Purches soils are closely related to the Homestead, Kasilof, and Spenard soils which commonly occupy adjoining areas. The Purches soils have mottled colors associated with wetness and are not as well drained as the Homestead and Kasilof soils.

Typical pedon of Purches silt loam in the SE corner of the NW1/4 NW1/4, Sec. 23, T14N, R3W, Seward Meridian:

O1--3 to 2 inches; partially decomposed forest litter.

O2--2 to 0 inches; black (10YR 2/1) decomposed forest litter; very strongly acid; abrupt smooth boundary.

A1--0 to 1 inches; black (10YR 2/1) mucky silt loam; moderate medium granular structure; very friable; very strongly acid; clear wavy boundary.

A2--1 to 3 inches; (gray 5Y 5/1) silt loam; moderate medium granular structure; very friable; strongly acid; clear smooth boundary.

B2--3 to 12 inches; dark brown (7.5YR 4/4) silt loam; many large distinct grayish brown mottles; moderate fine granular structure; very friable; few pebbles; strongly acid; abrupt wavy boundary.

IIC1--12 to 24 inches; grayish brown (2.5Y 5/2) gravelly sandy loam; common medium distinct olive brown mottles; moderate medium subangular blocky structure; friable; about 20 percent gravel; strongly acid; gradual boundary.

IIC2--24 to 40 inches; grayish brown (2.5Y 5/2) very gravelly sandy loam, massive; firm; about 60 percent gravel and cobbles; strongly acid.

The loess mantle ranges from 10 to 20 inches in thickness. Some pedons have no A1 horizon. The A2 horizon ranges from gray to dark gray or dark grayish brown (5Y 5/1 or 10YR 5/1 to 10YR 4/1 and 4/2).

The B2 horizon ranges fron dark yellowish brown to brown or dark brown (10YR 4/4 to 7.5YR 4/4 or 4/3). Mottles are dark reddish brown, grayish brown, and olive brown. Gravel content ranges from 0 to 20 percent.

The IIC horizon is dark gray, olive gray, or olive to grayish brown (5Y 4/1, 5/2, 4/3 to 2.5Y 5/2). Texture is typically very gravelly silt loam and very gravelly sandy loam. Gravel content ranges from 40 to 60 percent.

Raven series

The Raven series consists of fragmental, mixed Typic Cryorthods. These excessively drained soils formed in silty loess deposited in spaces between large angular boulders. They occupy very stony terminal moraines and talus slopes. Slopes range from 3 to 75%.

The Raven soils are closely related to the Homestead soils. They are stonier than the Homestead soils.

Typical pedon of Raven very stony silt loam in NE1/4 SW1/4, Sec. 16, T13N, R1W, Seward Meridian:

O1--1 to 0 inches; black (10YR 2/1) mat of partially decomposed organic materials, common roots; extremely acid; abrupt smooth boundary.

A1--0 to 1 inches; dark brown (7.5YR 3/2) silt loam; weak fine granular structure; very friable; common roots; extremely acid; abrupt wavy boundary.

A2--1 to 3 inches; grayish brown (10YR 5/2) very stony silt loam; weak fine granular structure; very friable; large angular stones occupy about 60 percent of the volume; common roots; very strongly acid; abrupt wavy boundary.

B2--3 to 7 inches; strong brown (7.5YR 5/6) very stony silt loam; weak fine granular structure; very friable; angular stones occupy 60 percent of the volume; common roots; very strongly acid; abrupt irregular boundary.

C1--7 to 18 inches; olive brown (2.5Y 4/4) very stony silt loam; weak fine granular structure; very friable; silt loam and fine gravel partially fill interstices between rock fragments; angular stones and boulders occupy about 70 percent of the volume; few roots.

The volume of rock fragments ranges from about 50 to 70 percent. Rock fragments are commonly angular, but in places they are rounded. Colors of the B horizon are in hues of 10YR or 7.5YR, values of 4 or 5, and chromas of 4 to 6.

Riverwash

Salamatof series

The Salamatof series consists of dysic Sphagnic Borofibrists, very poorly drained soils consist of deep, fibrous peat derived from sphagnum moss and sedges. They occupy nearly level muskegs in depressions in moraines.

Salamatof peat is closely related to Doroshin and Starichkof peat which commonly occur on similar positions on the landscape. Salamatof peat has a higher proportion of fibric materials derived from sphagnum moss than the Doroshin or Starichkof peats. In addition, they are deeper to mineral materials than the Doroshin peat.

Typical pedon of Salamatof peat in SE1/4 NW1/4, Sec. 26, T14N, R3W, Seward Meridian (reaction is determined in water suspension).

Oi1--0 to 5 inches; dark reddish brown (5YR 3/4, broken face) fibrous peat, brown (7.5YR 5/4) rubbed and pressed; 100 percent fiber, 90 percent after rubbing; massive; friable, nonsticky, nonplastic; more than 90 percent sphagnum moss fibers; many roots; very strongly acid; clear smooth boundary.

--5 to 55 inches; dark reddish brown (5YR 3/2 broken face) rous peat, reddish brown (5YR 5/4) rubbed and pressed; 90 percent er, 75 percent after rubbing; weak coarse platy structure; friable, sticky, nonplastic; more than 80 percent sphagnum moss fibers; y roots; very strongly acid; diffuse boundary.

--55 to 68 inches; dark reddish brown (5YR 3/2 broken face) rous peat; reddish brown (5YR 5/4) rubbed and pressed; 80 percent er rubbing; weak coarse platy structure; friable, nonsticky, non- stic; about 70 percent moss fibers and 30 percent sedge fibers; roots; very strongly acid.

organic materials range from 63 inches to many feet thick. The er table is usually within one foot of the surface.

kok series

Slikok series consists of coarse-silty, mixed, acid Histic aquepts. These poorly drained soils formed in deep silty sediments occupy valley bottoms, seepage areas, and low areas bordering es and muskegs. Slopes range from 0 to 12 percent.

slikok soils are closely related to the Doroshin and Torpedo e soils which commonly occupy similar positions on the landscape. Slikok soils have a higher proportion of mineral materials than roshin peat and are not as fine textured and firm as the Torpedo ke soils.

pical profile of Slikok mucky silt loam in NW1/4 NW1/4, Sec. 34, 5N, R2W, Seward Meridian:

--6 to 0 inches; black (10YR 2/1) partially decomposed organic terial; many roots; very strongly acid; clear smooth boundary.

--0 to 14 inches; very dark grayish brown (10YR 3/2) mucky silt am; weak fine granular structure; very friable; many roots; very rongly acid; clear wavy boundary.

g--14 to 24 inches; dark gray (10YR 4/2) silt loam; common, dium distinct dark yellowish brown mottles; weak thin platy structure; ry friable; few roots; very strongly acid; gradual boundary.

2g--24 to 40 inches; dark gray (10YR 4/2) silt loam; common large istinct olive brown mottles; massive; friable, nonsticky, nonplastic; w pebbles; very strongly acid.

he O horizon ranges from about 5 to 15 inches to thickness. The lack or very dark grayish brown A1 horizon is 4 to 15 inches thick and s silt loam or mucky silt loam in texture. Texture beneath the A1 orizon ranges from gravelly fine sandy loam to silt loam. Thin trata of fine sand and gravel are common in the lower part of the horizon.

Spenard series

The Spenard series consists of medial over loamy, mixed Sideric Cryaquods. These soils are deep and somewhat poorly drained. They have a mottled spodic horizon developed in a loess mantle that is underlain by loamy glacial till or lacustrine deposits. They occur in drainageways, muskeg borders, and depressions in moraines. Slopes range from 0 to 7 percent.

The Spenard soils are closely related to the Purches soils that commonly occupy similar positions on the landscape. The Spenard soils have a lower proportion of coarse fragments than the Purches soils.

Typical pedon of Spenard silt loam, NE1/4 NE1/4 of Sec. 23, T12N, R3W, Seward Meridian about 200 feet east of road.

O1--4 to 3 inches; partially decomposed moss; abrupt smooth boundary.

O2--3 to 0 inches; very dark grayish brown (10YR 3/2) well-decomposed organic matter; very strongly acid; abrupt smooth boundary.

A2--0 to 2 inches; dark gray (10YR 4/1) silt loam; weak thin platy structure; very friable; many roots; many very fine pores; strongly acid; abrupt wavy boundary.

B2--2 to 7 inches; dark brown (7.5YR 4/4) silt loam; common gray mottles; weak medium subangular blocky structure; very friable; many roots; many fine pores; tongues of A2 material; common fine concretions; strongly acid; cleary wavy boundary.

B3--7 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; many large dark gray mottles; moderate thin platy structure; friable; common roots; many fine pores; many fine and medium concretions; strongly acid; gradual smooth boundary.

IIC1--16 to 50 inches; dark grayish brown (2.5Y 4/2) gravelly silt loam; common gray mottles; strong coarse platy structure; firm; few fine pores; strongly acid.

Some pedons have a thin silt loam or mucky silt loam A1 horizon. The spodic horizon ranges from 14 to 20 inches in thickness and has hues of 10YR or 7.5YR. values of 3 or 4, and chromas of 2 to 4. The underlying material ranges from gravelly silt loam to gravelly sandy loam and is stratified in some pedons.

Starichkof series

The Starichkof series consists of dysic Fluvaquentic Borohemists. These very poorly drained soils are made up of deep, partially decomposed sedge peat. They occur in nearly level muskegs in moraines.

Starichkof peat is closely related to Doroshin and Salamatof peat which commonly occupy similar positions on the landscape. Starichkof peat is deeper to a mineral substratum than Doroshin peat and is not as fibrous as Salamatof peat.

Typical pedon of Starichkof peat, east of Birchwood loop road, SE1/4 NW1/4, Sec. 19, T15N, R1W, Seward Meridian (reaction is determined in water suspension).

Oe1--0 to 7 inches; dark reddish brown (5YR 2/2, broken face) partially decomposed sedge peat, very dark grayish brown (10YR 3/2) pressed and rubbed; about 55 percent fiber, about 45 percent rubbed; massive; friable, nonsticky, nonplastic; common fine and medium roots; mixed moss and sedge fibers; less than 10 percent mineral material; strongly acid; clear smooth boundary.

Oe2--7 to 20 inches; very dark grayish brown (10YR 3/2, broken face) partially decomposed sedge peat, very dark brown (10YR 2/2), pressed, very dark grayish brown (10YR 3/2) rubbed; about 70 percent fiber, about 35 percent rubbed; massive; friable, nonsticky, nonplastic; few fine roots; mixed moss, sedge, and wood fibers; less than 10 percent mineral material; strongly acid; clear smooth boundary.

Oe3--20 to 32 inches; dark reddish brown (5 YR 2/2, broken face) partially decomposed sedge peat, dark reddish brown (5 YR 3/3) pressed and rubbed; about 80 percent fiber, about 55 percent rubbed; moderate medium platy structure; friable, nonsticky, nonplastic, fine moss fibers; less than 5 percent mineral material; strongly acid; gradual boundary.

Oe4--32 to 48 inches; very dark brown (10YR 2/2, broken face) partially decomposed sedge peat, very dark grayish brown (10YR 3/2) pressed and rubbed; about 50 percent fiber, about 20 percent rubbed; massive, mixed moss and sedge fibers; less than 10 percent mineral material; strongly acid.

Oe5--48 to 60 inches; black (10YR 2/1, broken face) partially decomposed sedge peat, very dark brown (10YR 2/2) pressed and rubbed; massive; mixed moss and sedge fibers; 10 to 20 percent mineral material; strongly acid.

Some pedons have a thin surface layer of fibrous peat. Thin discontinuous layers of silt, ash, and well-decomposed peat are present in many pedons. The water table is commonly within one foot of the surface.

Torpedo Lake series

The Torpedo Lake series consists of fine-loamy, mixed, acid Histic Cryaquepts. These poorly drained soils formed in firm glacial till and occur in drainageways and seepage areas in moraines. Slopes range from 0 to 20 percent.

The Torpedo Lake soils are closely related to the Jacobsen and Slikok soils which commonly occupy similar positions on the landscape. The Torpedo Lake soils are not as stony as the Jacobsen soils. They have firmer, finer textured substrata than the Slikok soils.

Typical pedon of Torpedo Lake in the SE1/4 SW1/4, Sec. 8, T12N, R3W, Seward Meridian:

O1--13 to 2 inches; brown (7.5YR 5/4) undecomposed sphagnum moss peat; many roots; extremely acid; abrupt smooth boundary.

O2--2 to 0 inches; very dark gray (5YR 3/2) well-decomposed organic matter; many roots; extremely acid; abrupt smooth boundary.

A11--0 to 2 inches; black (5YR 2/1) mucky silt loam; weak fine crumb structure; very friable, many roots; extremely acid; abrupt smooth boundary.

A12--2 to 4 inches; dark reddish brown (5YR 2/2) gravelly sandy loam; weak fine crumb structure; very friable; many roots; extremely acid; abrupt smooth boundary.

C1--4 to 6 inches; dark grayish brown (2.5Y 4/2) gravelly sandy loam; massive; friable; common roots; very strongly acid; clear smooth boundary.

C2g--6 to 10 inches; olive gray (5Y 5/2) gravelly sandy loam; common fine faint dark gray mottles; massive; friable; few roots; strongly acid; clear smooth boundary.

C3g--10 to 47 inches; olive gray (5Y 5/2) gravelly clay loam; many medium distinct olive brown mottles; massive; firm, sticky, plastic; strongly acid.

Gravel content ranges from about 15 to 30 percent and cobblestones from 0 to 10 percent. In places there are a few large boulders near the surface. The texture ranges from gravelly sandy loam to gravelly silt loam in the upper 10 inches and from gravelly sandy clay loam to gravelly silty clay loam in the substratum. Colors in the fine-loamy substratum are in hue of 2.5Y or 5Y, values of 4 or 5, and chromas of 1 or 2.

Tuomi series

The Tuomi series consist of medial over loamy, mixed Typic Cryorthods. These soils are formed in stratified sandy and silty waterworked materials capped with a mantle of loess. They occur in ancient drainageways and high dissected hills and have slopes ranging from 0 to 75 percent.

The Tuomi soils are closely related to the Anchorage and Homestead soils that commonly occur on adjoining areas or similar landscapes. The Tuomi soils are not as sandy as the Anchorage soils and not as gravelly as the Homestead soils.

Typical pedon of Tuomi silt loam in the NW1/4 SE1/4 SE1/4, Sec. 21, T13N, R4W, Seward Meridian:

O1--4 to 0 inches; black (10YR 2/1) partially decomposed organic matter; many roots; very strongly acid; abrupt, smooth boundary.

A2--0 to 2 inches; grayish brown (2.5Y 5/2) silt loam; weak, thin platy structure; very friable; common fine roots; very strongly acid; abrupt wavy boundary.

B21--2 to 8 inches; dark brown (7.5 Y 4/4) very fine sandy loam; moderate fine granular structure; very friable; common roots; strongly acid; gradual boundary.

B22--8 to 15 inches; dark yellowish brown (10YR 4/4) very fine sandy loam, weak, moderate granular structure; very friable; few roots; strongly acid; gradual boundary.

C1--15 to 42 inches; very dark grayish brown (2.5Y 3/2) fine sandy loam; weak, very thin platy structure; very friable; many strata of loose fine sand and loamy fine sand ranging from 1/4 to 2 inches in thickness; strongly acid.

The loess mantle ranges from silt loam to fine sandy loam in texture and from 10 to 20 inches in thickness. The weighted average texture of the stratified substratum materials is fine sandy loam or sandy loam. Individual strata range from sand to silt loam in texture and from less than one inch to 4 inches in thickness, and vary in arrangement and number. Gravel content ranges from 0 to 15 percent. Colors in the upper portion of the spodic horizon are in hues of 5 YR or 7.5YR, with values of 4 or 5; and chromas of 4 to 6. The lower portion of the spodic horizon commonly extends into the stratified materials.

Urban Land

Rock Outcrop

Turnagain

Fire Island

Waterbody

PRE-INTERPRETED GEO-ENVIRONMENTAL VARIABLES

-SLOPE STABILITY

1 = Generally High and Highest Stability

Nearly flat to moderate slopes underlain by metamorphic and sedimentary rocks. Loose material is thin or absent in most places. There is little likelihood of any significant downhill movement of rock or loose material. Nearly flat to moderately gentle slopes underlain by surficial deposits; moderate slopes underlain by surficial deposits consisting of gravel and sand, and mixed gravel, sand, silt, and clay; and steep slopes underlain by metamorphic rock. In most of this area there is little likelihood of significant downslope movement. However, in some places the following situations may produce minor and, at times, major slope failures: (1) In response to strong earthquake shock, nearly flat areas behind the tops of sea and river bluffs may be incorporated into landslides on the bluffs, and the nearly flat areas at the base of the bluffs may be overridden by landslide debris. (2) Areas along major streams may be subject to erosion and become unstable. (3) The modern tidal flats are covered intermittently by water and are subject to some instability caused by minor erosion. (4) In areas of steep slope the metamorphic bedrock is covered in places by loose surficial deposits (chiefly stream deposits and colluvium) and by weathered bedrock; such deposits may be subject to some downslope movement.

2 = Moderate Stability

Steep slopes underlain chiefly by gravel and mixed gravel, sand, silt, and clay; and very steep slopes underlain by metamorphic and sedimentary rocks. In hummocky topography, small hills are stable in their natural state of vegetation but can become unstable when disturbed. On steep slopes at lower elevations in the mountains, slope deposits are generally unstable and continually move downward; the likelihood of instability increases when the surface is disturbed. At higher altitudes on the very steep slopes, bed-

rock is at or near the surface and is inherently more stable than the surficial deposits, but locally these slopes are thinly covered by loose material that is easily disturbed and subject to more frequent and more rapid downward movement here than on the lower slopes. Snow avalanches occur most commonly on these slopes and carry some rock debris with them. One area of steep slope contains a landslide deposit; the occurrence of similar future landslides in other places cannot be ruled out, although such a probability at any one point is small.

3 = General Low Stability

Steep slopes underlain chiefly by silt and clay; very steep slopes underlain chiefly by gravel and sand, and mixed gravel, sand, silt, and clay; and precipitous slopes underlain by metamorphic and sedimentary rocks. Sea and river bluffs and other escarpments have some slight degree of natural stability, especially where vegetated; however, they become unstable when disturbed either by natural processes such as earthquakes or erosion, or by excavation and other activities which disturb natural ground cover. Small scale downslope movement may occur in many places; erosion in gullies produces unstable slopes on which small landslides are to be expected locally. Cliffs high in the mountains are the sites of frequent minor rockfalls that enlarge talus accumulations at the base of these slopes; occasional major rockfalls or landslides may release substantial quantities of material to encroach on the slopes below.

4 = Lowest Stability

Very steep slopes underlain by sand, silt, and clay, and by landslide deposits; and precipitous slopes underlain by the entire suite of surficial deposits. The least stable slopes occur mainly in river bluffs, where erosion is active, thereby preventing stabilization and producing continuous downslope movements that range from nearly imperceptible soil creep, through observable viscous earth flows and talus accumulation, to small landslides. Elsewhere in areas shown on this map unit the slopes can readily fail when disturbed by natural or manmade processes.

9 = Water

-MASS WASTING

00 = No Known Mass Wasting Potential

Near-level areas away from potential avalanche runout zones. Predominantly stream terraces and alluvial fans. Some gently sloping glacial moraines.

10 = Low to Moderate Mass Wasting Potential

Moderately stable bluffs and hummocky lowland areas, but containing local conditions susceptible to landsliding, primarily underlain by glacial moraine, outwash and alluvium. Very low avalanche potential near the base of the mountains. No avalanche potential in the lowlands.

20 = Moderate to High Mass Wasting Potential

Steep upland terrain with potential for snow avalanches, rockslides, rockfall and landslides. Probably contains many areas that belong in Zone 3 if a detailed assessment were made. Includes lowland stream and coastal bluffs that have moderate high low slope stability (Dobrovolny and Schmoll, 1974).

30 = Highest Known Mass Wasting Potential

Each area is one or more of the following:

31 = Known Snow Avalanche Path or Area of Many Paths

Based on air photo interpretation of vegetation patterns, and reports by Chugach State Park and State of Alaska, Department of Transportation. All paths have not been identified. May include small areas which are unlikely to experience avalanches.

32 = Known Rockfall and Rockslide Area

Based on Department of Transportation and State Park data. Most snow avalanche areas, as indicated, also have a high rockslide potential.

33 = Known Landslide Area

Includes areas of known mass wasting except avalanche and rockfall/rockslide areas. Based on Department of Transportation data and geologic maps by Schmoll and Dobrovolny (1972 and unpublished), and Zenone, et al. (1974) Includes mudslide areas, sloughing along coastal bluffs and streams, and upland colluvial slides.

99 = Water

2 = Area of Slow to Moderate Coastal Erosion

Bluffs and beaches which are subject to occasional tidal and wave action.

3 = Area of Rapid Coastal Erosion

Bluffs at Pt. Woronzof directly exposed to frequent tidal and wave action. Rate of horizontal retreat up to 2.5 ft./year.

9 = Water

-FOUNDATION CONDITIONS

1 = Foundation Conditions Excellent

Hard bedrock is at the surface or at shallow depth and can support very heavy loads. Excavation difficult; require blasting. In many places slopes range from steep to precipitous, and operation of heavy equipment may be restricted; in some places cliffs and canyon walls preclude use as foundation sites for most structures.

2 = Foundation Conditions Good

Chiefly homogeneous gravel and sand that is generally 20 feet or more thick and can accommodate heavy loads. Excavation by power equipment generally easy except in isolated places where large boulders are present.

3 = Foundation Conditions Generally Good to Fair, But Locally Poor

Good in most of map area where various materials, including gravel, sand, and diamicton (mixed gravel, sand, silt, and clay), can support heavy to moderately heavy loads; fair to poor in some depressions in areas of hommocky topography where fine-grained material may have lower vearing strength, and on some steep slopes of limited extent where instability problems are likely. Excavation by power equipment generally easy, but may be moderately difficult where diamicton is very compact or where boulders are present. The material varies widely in texture; in places where fine grained, cuts may be unstable.

4 = Foundation Conditions Generally Fair to Poor

Silt and clay may lack sufficient bearing strength for heavy loads; moderate to very steep slopes are potentially unstable. in places, indicated by line pattern, peat is present at the

surface and the water table may be high; in some of these places peat can be removed, the water table lowered relatively easily, and foundation conditions thereby improved. Excavation hindered where steep slopes pose difficult operating problems and where fine-grained materials cause cut slopes to be unstable; bedrock may be encountered at shallow depth in the mountainous part of this area.

5 = Foundation Conditions Poor

Chiefly fine-grained materials (silt and clay) that have low bearing capacity; also includes extensive areas of poorly drained material, small areas of active sand dunes, and the sea and river bluffs that are either composed mostly of unstable fine-grained material or that are now being eroded. In places, indicated by line pattern, considerable thicknesses of peat may be present, and (or) marsh conditions may prevail; the peat is generally underlain by silt and clay, and these areas are more difficult to modify for unsuitable foundation conditions than the peat areas of the preceding map unit. Excavation is hindered by unstable materials and high water table.

9 = Water

-GROUNDWATER

1 = > 20 ft. to groundwater (low potential for drainage problems)

2 = < 20 ft. to groundwater (moderate potential for drainage problems)

9 = Waterbody

-PERMAFROST

1 = Moderate Potential for Permafrost Conditions

Permafrost may occur in small isolated zones throughout this area. No area should be considered free from permafrost without subsurface exploration.

2 = High Potential For Isolated Permafrost Conditions

Outlined by the Municipality of Anchorage Geotechnical Commision (unpublished).

3 = Unassessed Potential For Permafrost Conditions

The entire Eagle River and Turnagain Arm sheets are included in this category. Permafrost is possible at any location in these areas.

9 = Water

-WETLAND TYPES

0 = Not a Wetland

1 = Patterned Open Complex

Large blanketing bog; no obvious basin; sharp boundaries between forest and non-forest areas; surface patterns in the form of pools and tree islands.

2 = Non-Patterned Elongated Complex

Slightly sloped bog, located within a stream or glacial valley; having inlet or outlet stream; gradual transition into low forest; usually no surface patterns.

3 = Lakeside Complex

Small to large flat bog bordering a lake; low shrubs usually dominant.

4 = River Terrace

Low shrub or low forest bog located on old river terraces above the current river flood plain; in filled oxbows or channels.

5 = Concentric Closed Complex

Closed basin bog in smaller kettle holes or old lake basins; concentric wetland formations having sharp transitions; usually no open water.

6 = Forested, Closed Bog

Small to large, simple black spruce bog in closed basin; no open water; without inlet or outlet, or with small inconspicuous drainage channel.

7 = Unforested Closed Bog

Small simple closed basin without forested borders; may have surface pattern or central pool.

8 = Large Freshwater Marsh

Simple, usually without forested borders and with narrow-leaved emergent grasses.

9 = Waterbodies

-NAMED WETLANDS

For descriptions of Wetlands, please see "Anchorage Wetlands Study: Resource Analysis" which gives a detailed account of Wetlands map.

-HABITATS

0 = Not habitat

1 = Shore birds, gulls, terns, waterfowl migration, staging and nesting areas.

2 = Moose wintering area.

3 = Anadromous fish.

4 = Shore birds, gulls, terns, waterfowl migration, staging and nesting areas.

5 = Moose wintering area. Anadromous fish.

6 = Shore birds, gulls, terns, waterfowl migration, staging and nesting areas. Moose wintering area. Anadromous fish.

Appendix C
Soil Expansion Matrix

Agricultural Capability Class
K Value
Drainage
Depth
Soil Limitations
  Local Roads
  Septic Tank
  Shallow Excavation
  Dwellings without Basements
  Dwellings with Basements
  Small Commercial Buildings
  Campgrounds
  Picnicgrounds
  Playgrounds
  Paths

SOIL EXPANSION MATRIX
ANCHORAGE ITUM

Code	Soil Series	Agric. Cap. Class	K Value		Drainage	Depth	Soil Limitations									
			Surface	Sub Surface			Local Roads	Septic Tank	Shallow Excav.	Dwellings w/o Basement	Dwellings w/ Basement	Small Comm. Bldg.	Camp	Picnic	Play	Path
1	Anchorage	7	.37	.10	1	54	3	3	3	3	3	3	3	3	3	3
2	Caswell	3	.20	.10	4	42	3	3	3	2	3	2	2	2	2	2
3	Chena	6	.20	.10	1	44	3	3	3	3	3	3	3	2	2	2
4	Clam Gulch	4	.43	.37	6	40	3	3	3	3	3	3	3	3	3	3
5	Cryaquents	9	99	99	6	99	9	9	9	9	9	9	9	9	9	9
6	Cryorthents gr fill	9	99	99	2	99	9	9	9	9	9	9	9	9	9	9
7	Cryorthents lm fill	9	99	99	3	99	9	9	9	9	9	9	9	9	9	9
8	Cryorthents gr smooth	9	99	99	2	99	9	9	9	9	9	9	9	9	9	9
9	Cryorthents lm smooth	9	99	99	3	99	9	9	9	9	9	9	9	9	9	9
10	Cryorthents - Doroshin	9	99	99	5	99	3	3	3	3	3	3	3	3	3	3
11	Cryorthents - Salamatoff	9	99	99	5	99	3	3	3	3	3	3	3	3	3	3
12	Doroshin	7	99	.28	7	40	3	3	3	3	3	3	3	3	3	3
13	Goodhope	2	.43	.37	4	40	3	2	2	2	2	2	2	2	2	2
14	Gravel Pits	9	99	99	3	99	9	9	9	9	9	9	9	9	9	9
15	Grewingk	6	.37	.15	5	33	3	3	3	3	3	3	3	3	3	2
16	Homestead	3	.37	.15	3	48	2	2	2	2	2	3	2	2	3	2
17	Homestead shallow	4	.37	.15	3	48	3	3	3	3	3	3	3	3	3	3
18	Jacobsen USSL	7	.28	.10	6	34	3	3	3	3	3	3	3	3	3	3
19	Kalifonsky	3	.37	.10	6	40	3	3	3	3	3	3	3	3	3	3
20	Kasilof	2	.37	.10	1	40	1	1	3	1	1	1	2	2	2	2
21	Moose River	6	.15	99	6	42	3	3	3	3	3	3	3	3	3	3

SOIL EXPANSION MATRIX
ANCHORAGE ITUM

Code	Soil Series	Agric. Cap. Class	K Value		Drainage	Depth	Soil Limitations									
			Surface	Sub Surface			Local Roads	Septic Tank	Shallow Excav.	Dwellings w/o Basement	Dwellings w/ Basement	Small Comm. Bldg.	Camp	Picnic	Play	Path
22	Niklason	3	.15	99	3	18	3	3	3	3	3	3	3	2	2	1
23	Purches	4	.43	.32	4	40	3	3	2	1	2	2	2	2	2	2
24	Raven	6	.28	99	1	40	3	3	3	3	3	3	3	3	3	3
25	Riverwash	9	99	99	1	99	9	9	9	9	9	9	9	9	9	9
26	Salamatof	7	99	99	7	60	3	3	3	3	3	3	3	3	3	3
27	Slikok muck	4	.28	.28	6	40	3	3	3	3	3	3	3	3	3	3
28	Spenard	4	.37	.37	5	50	3	3	3	3	3	3	3	3	3	2
29	Starichkof	7	99	99	7	50	3	3	3	3	3	3	3	3	3	3
30	Torpedo Lake	7	.24	.28	6	47	3	3	3	3	3	3	3	3	3	3
31	Tuomi	2	.43	.32	3	42	2	2	2	2	2	3	2	2	2	2
32	Urban land	9	99	99	9	99	9	9	9	9	9	9	9	9	9	9
33	Rock outcrop	9	99	99	9	99	9	9	9	9	9	9	9	9	9	9
34	Homestead - Rockcrop	9	.37	99	4	99	9	9	9	9	9	9	9	9	9	9
35	Turnagain	4	.28	99	1	19	3	3	3	3	3	3	3	3	3	3
36	Turnagain - Rock outcrop	9	.28	99	2	99	9	9	9	9	9	9	9	9	9	9
50	Urbanland disturbed	9	99	99	9	99	9	9	9	9	9	9	9	9	9	9
51	Fire Island	9	99	99	9	99	9	9	9	9	9	9	9	9	9	9
99	Waterbody	8	88	88	8	88	8	8	8	8	8	8	8	8	8	8

Soil Expansion Code Legend
Anchorage ITUM

Agricultural Capability Class

1 = I
2 = II
3 = III
4 = IV
5 = V
6 = VI
7 = VII
8 = VIII
9 = Not Rated

Drainage Rating

1 = Excessive
2 = Somewhat Excessive
3 = Well
4 = Moderately Well
5 = Somewhat Poor
6 = Poor
7 = Very Poor
9 = Not Rated

Limitation Ratings

1 = Slight
2 = Moderate
3 = Severe
9 = Not Rated

APPENDIX D
GRID MULTI-VARIABLE FILE

ANCHORAGE ITUM MVF

1) ROW
2) COLUMN
3) MAP NUMBER
4) TERRAIN UNIT POLYGON NUMBER
5) LAND USE POLYGON NUMBER
6) TERRAIN UNIT TUNGEN NUMBER
7) LANDFORM TYPE
8) UNIQUE LANDFORM
9) LANDFORM 1 (1 CONNECTOR; 2-4 LANDFORM)
10) LANDFORM 2 (1 CONNECTOR; 2-4 LANDFORM)
11) LANDFORM 3 (1 CONNECTOR; 2-4 LANDFORM)
12) VEGETATION
13) GEOLOGY
14) SLOPE
15) SURFACE FORM
16) SOILS AND SOIL SURVEY (1 SOIL SURVEY; 2-3 SOIL TYPE)
17) SLOPE STABILITY
18) MASS WASTING
19) SEISMICALLY INDUCED GROUND FAILURE
20) FLOOD/EROSION (1 EROSION; 2 FLOOD)
21) FOUNDATION CONDITION
22) GROUNDWATER
23) PERMAFROST
24) WETLAND TYPE AND NAME (1-3 WETLAND NAME; 4 WETLAND TYPE)
25) HABITATS
26) ELEVATION PROVINCE
27) LAND USE
28) EARTHQUAKE INTENSITY

SOILS MATRICES

29) AGRICULTURE CAPABILITY (1 DIGIT)
30) K VALUES (1-2 SUBSURFACE VALUES; 3-4 SURFACE VALUES)
31) DRAINAGE/DEPTH (1-2 DEPTH; 3 DRAINAGE)
32) ROADS/SEPTIC/EXCAVATIONS (1 EXCAVATION; 2 SEPTIC; 3 ROADS)
33) WO BASEMENT/W BASEMENT/BUILDINGS (1 BUILD; 2 W BASE; 3 WO BASE)
34) RECREATIONAL (1 PATH; 2 PLAY; 2 PLAY; 3 PICNIC; 4 CAMPING)